

# OPERATION MANUAL



**Die Bonder & Component Placer  
T-5300 / T-5300-W**



## Thank you for purchasing the Dr. Tresky AG Die Bonder & Component Placer T-5300

The information presented in this manual contains the necessary key points to effectively maintain and keep the Die Bonder & Component Placer T-5300 operating. It is an integral part of a technical training course, not a complete documentary reference manual.

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This equipment is designed as a universal platform for various pick-and-place technologies / processes. Additional options are necessary to meet specialized customer requirements. For these options, TRESKY has the right to use / modify certain "standard" functions on the basic machine which may not correspond with the description in this manual.

Some software may differ from its retail version (if available) and may not include user manuals or all program functionality.

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## 1 Introduction

The Die Bonder & Component Placer T-5300 represents high quality electronics assembly equipment, featuring a highest possible flexibility of a broad variety of applications. This system is made and configured, individually on customer's specification.

The Die Bonder & Component Placer T-5300 is a manual system, with one automated axis (Z). The ergonomic design of the operating elements increases high repeatability and flexibility.

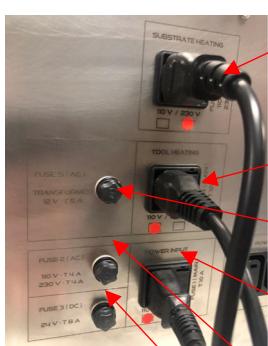
This equipment is a sophisticated system incorporating sensitive fine mechanical, pneumatic, electronic modules and software. In the following description the Die Bonder & Component Placer T-5300 and/or T-5300-W will be named simply as "5300" or "the machine".

### 1.1 Layout of Documentation

This document includes mechanical description of the machine according to the table of contents. The date of issue of this instruction manual is found at footer on each page e.g. 09.2021.

### 1.2 Technical Data

#### Electrical Input



##### **Substrate Heating Power**

220 ... 240 Volt

Fuses T 10 A

110 ... 120 Volt (NOT Recommended; please contact first Tresky AG)

Fuses T 20 A

##### **Tool Heating Power (Fuse4 Main)**

110 ... 240 Volt (only with Tool Heating Option required)

Fuses T 10 A

##### **AC Power (Fuse5 AC)**

12 Volt

(only with Tool Heating Option required)

Fuses T 05 A

##### **Main Power (Fuse1 Main)**

110 ... 240 Volt

Fuses T 10 A

##### **AC Main Power (Fuse2 Main)**

110 ... 240 Volt

Fuses T 04 A

##### **DC Power (Fuse3 Main)**

24 Volt

Fuses T 08 A

### Compressed Air

Integrated electronic pressure regulator adjusted on 5 bar. The supplied air has to be clean and dry.

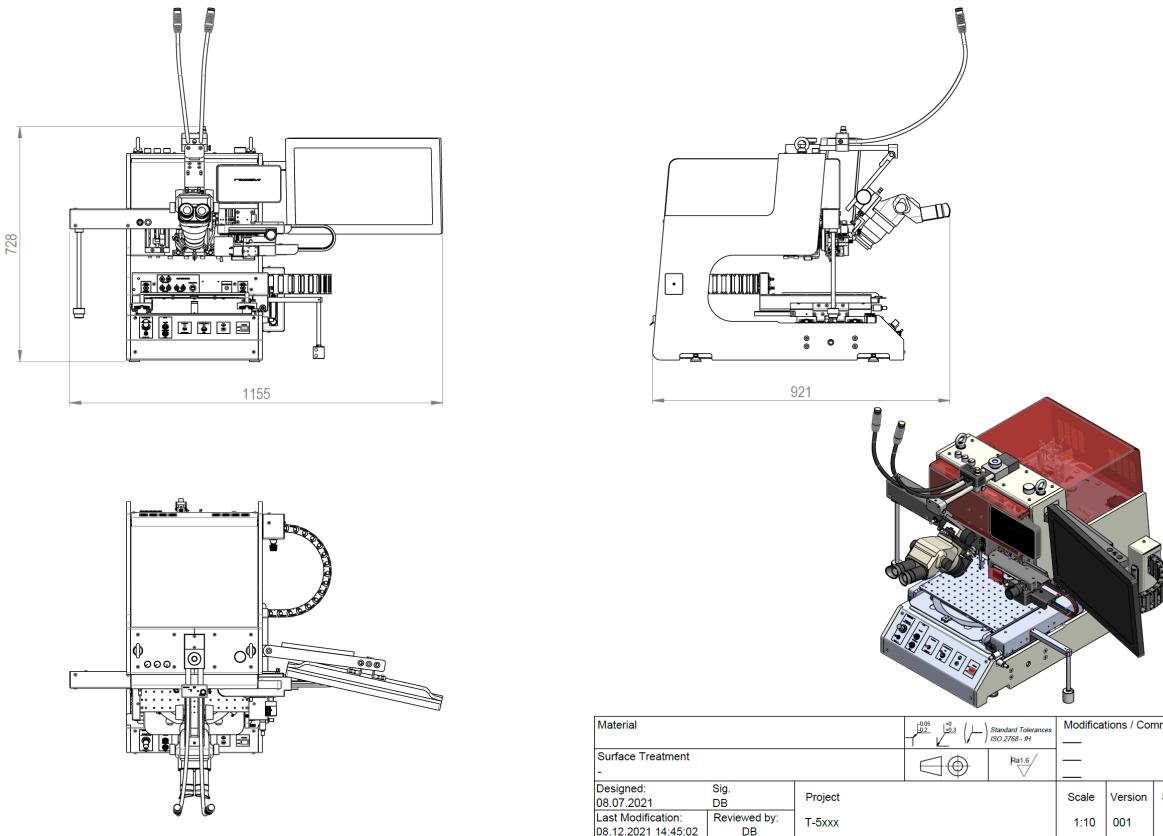
- Minimum 5 bar
- Maximum 8 bar

### Vacuum

- Minimum 0.5 bar (abs)
- Maximum 0.9 bar (abs)

### Dimensions

Machine required space (approx.) 1150mm x 921mm x 728mm

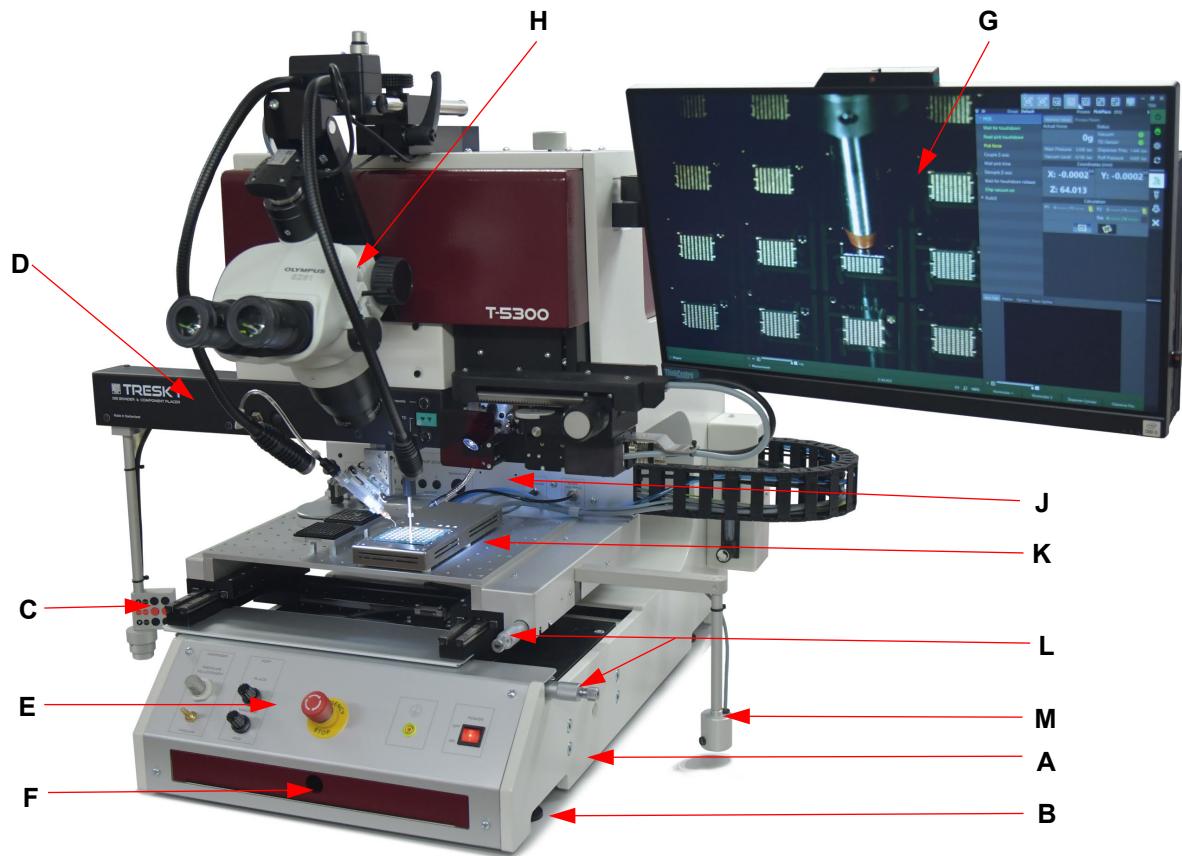


### Weight

T-5300 = approx. 85 Kg (depending on options: up to 125Kg)

T-5300-W = approx. 95 Kg (depending on options: up to 135Kg)

### 1.3 General View



<b>A</b>	Frame	<b>G</b>	All-in-One-PC
<b>B</b>	Leveling screws	<b>H</b>	Microscope
<b>C</b>	6-Button panel	<b>J</b>	Terminal
<b>D</b>	Pick & place arm	<b>K</b>	XY-worktable
<b>E</b>	Front panel	<b>L</b>	XY-micrometer adjustment
<b>F</b>	Drawer with Keyboard	<b>M</b>	XY-arm with release button

## 2 Commissioning

### 2.1 Requirements of Installation and Commissioning Personnel

The T-5300 has been calibrated and put into service by DR. TRESKY AG service technicians in Switzerland. TRESKY service technicians have been trained in the factory about the station.

Trained service personnel of the customer are also authorized to install the machine if they have an appropriate mechanical qualification.

The reading and understanding of this manual are an integral part of qualification and training of authorized personal.

### 2.2 Unpacking and Lifting

- After a general inspection of the transportation box and the shock detector, loosen screws of the top cover and take it down.



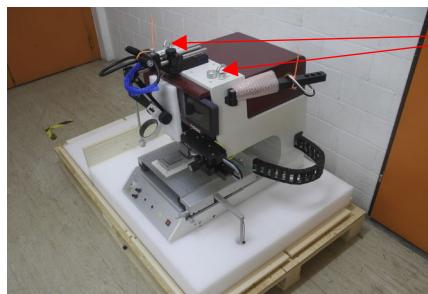
- Take out the accessory parts.



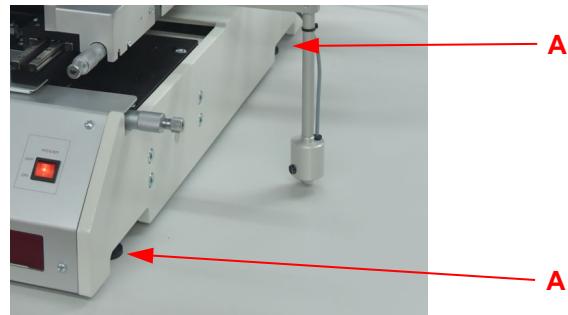
- Remove (unscrew) the side boards of the wooden box carefully.



- The machine (without components approx. 85-135kg) should be lifted with extreme care and by at least three to four strong persons, at best with a crane on the eyelets. Short transportation of the T-5100 within the customers department should be undertaken with great care and on a trailer with rubber wheels.



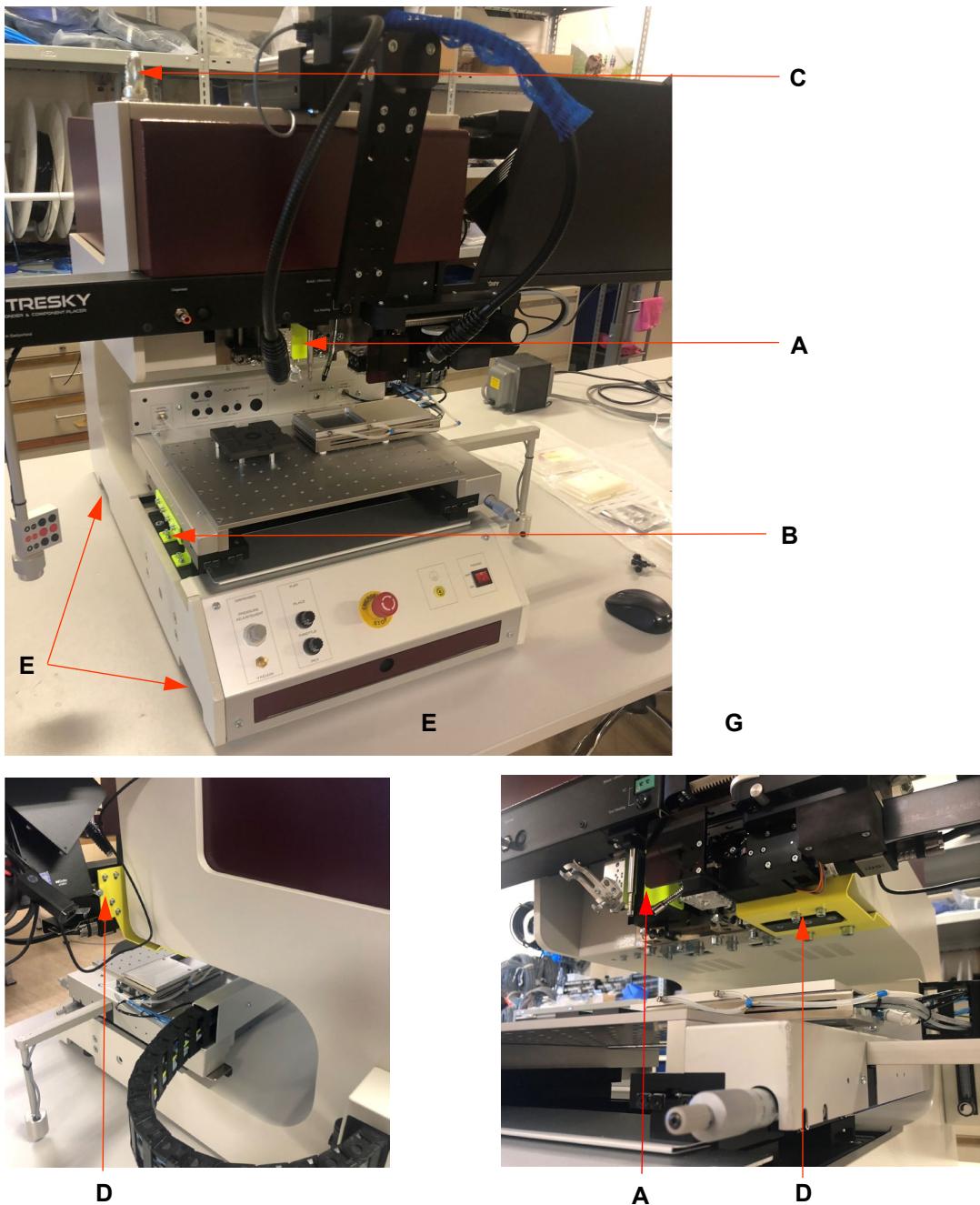
Lift the machine, if possible,  
by the eyelets



### Handle the machine only by the handle openings A!

Handling the machine by other parts (Pick & Place arm, XY- table or other guided parts) is extremely dangerous and can cause non-reparable damages **which are not covered by warranty!**

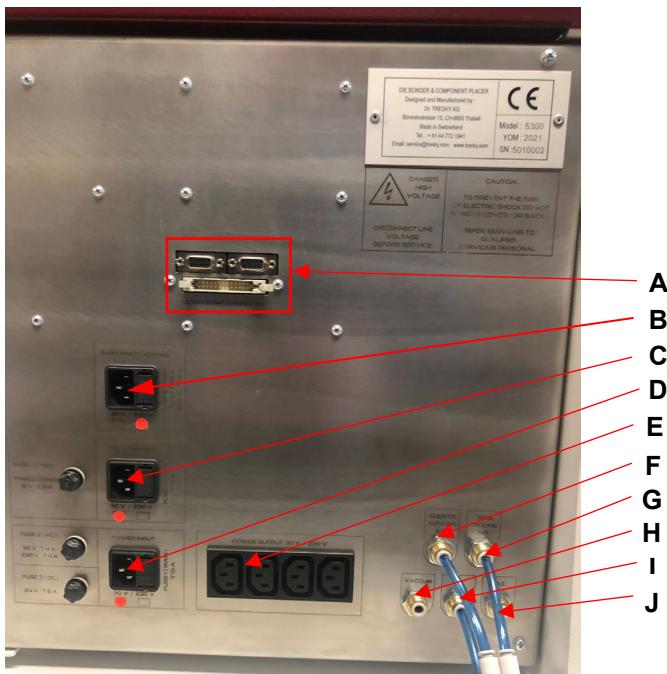
## 2.3 Setup and Leveling



- Remove all YELLOW safeguard **A**, **B** and **D** as well ORANGE cable straps
- Remove the **C** eyelets and insert the supplied black plastic cover/plug

Elevate the T-5300 by means of four leveling screws **E** so, that the XY-work table remains stationary in any required position. For easier turning of the leveling screws **E**, lift the machine simultaneously slightly by the handle openings.

## 2.4 Back Wall Connections (Compressed Air and Vacuum Supply)



### Requirement compressed air:

The supplied air has to be clean and dry.

- Minimum 5 bar
- Maximum 8 bar

### Requirement vacuum:

- Minimum 0.5 bar (abs)
- Maximum 0.9 bar (abs)

- |          |   |          |   |
|----------|---|----------|---|
| <b>A</b> | Interface to Ultrasonic Generator<br>(Option) | <b>F</b> | Air for Cool down of Substrate Heating QH<br>(Option) |
| <b>B</b> | Main Power Substrate Heating<br>(Option)      | <b>G</b> | Air for Cool down of Tool Heating<br>(Option)         |
| <b>C</b> | Main Power Tool Heating (Option)              | <b>H</b> | Vacuum Machine  |
| <b>D</b> | Main Power Machine                            | <b>I</b> | Compressed Air Machine                                |
| <b>E</b> | Power output (switched)                       | <b>J</b> | Gas/Forming Gas for QH (Option)                       |

## 2.5 Power Supply Machine



Before main power cable A is plugged in, make sure POWER switch is in OFF position

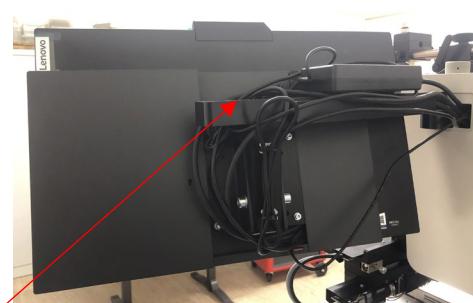
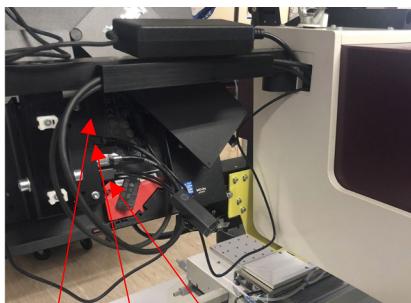
- A** Main power cable (IN)
- B** Power cable (OUT) for additional components (up to 4 are possible)
- C** Power cable (IN) for Tool Heating
- D** Power cable (IN) for Substrate Heating

## 2.6 PC Connections

The location of connections can vary, depending on PC series.

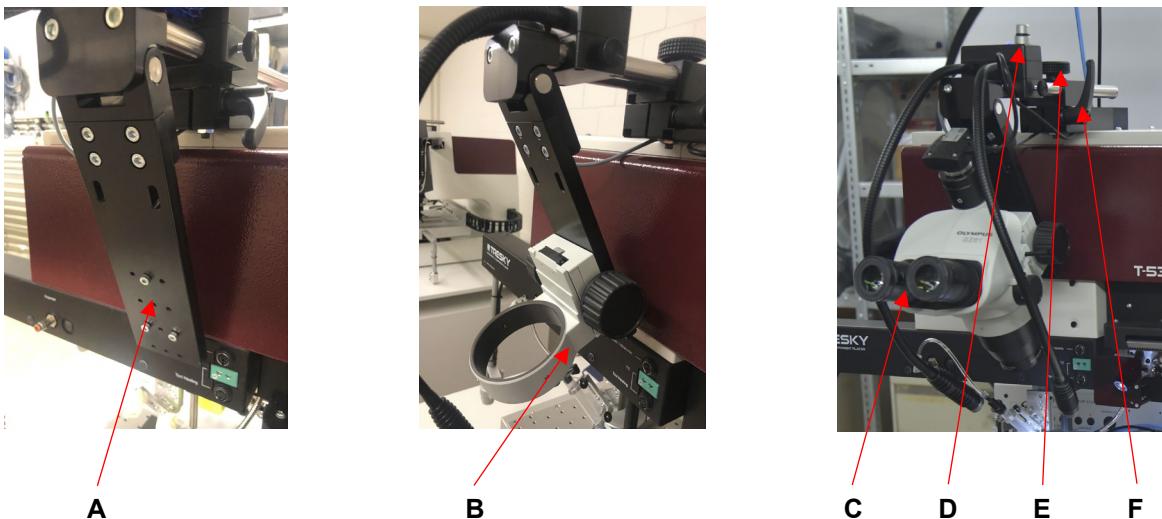


Remove cable tie



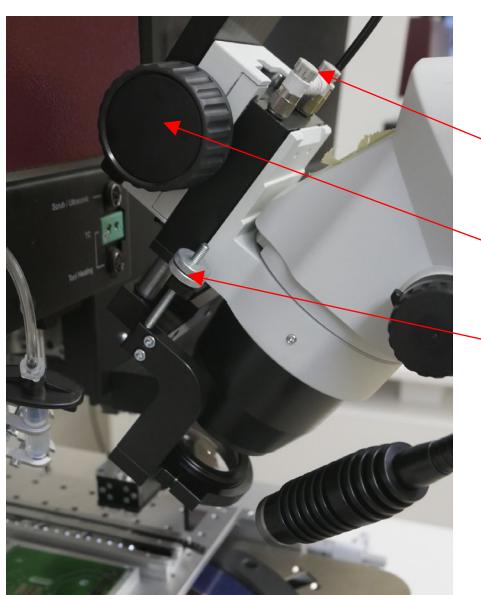
- A** Main power cable
- B** LAN cable to machine
- C** 4 USB Ports (for Keyboards, Cameras, Machine-Options, ...)
- D** M10 (30mm length) Screw to hold all in one PC

## 2.7 Microscope



- A** Microscope base plate for holding the (Olympus) focus unit. Several height position possible, according to substrate holder height.
- B** Microscope focus unit (spigot holder has to be removed from original Olympus focus unit; 3 crews)
- C** Microscope or Trinocular
- D** LED Lightning (On/Off and intensity)
- E** For moving microscope unit front/back
- F** For rotation of microscope (corresponding with bonding axis)

Microscope on T-5300-W system



Systems with Wafer are equipped with a mechanical unit to have focus on two different heights (Wafer- Pick-up height and placement height) by movement of the pre lens.

Throttle for up/down speed

Focus when lens is up (wafer)

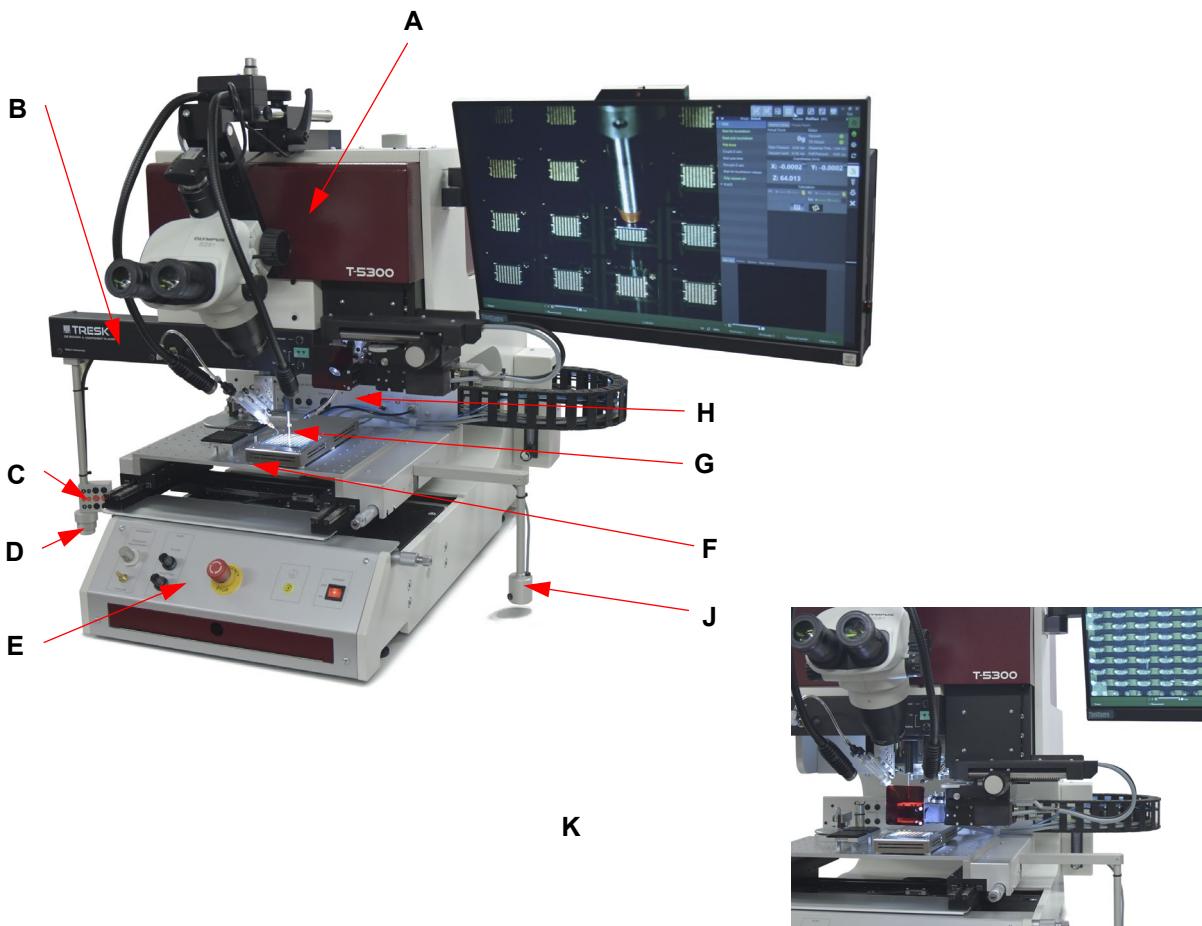
Focus for second level when lens is down (substrate)

### 3 Design and Function

In this chapter, we present the basic elements, their function and organization within the T-5300. Actual operation and procedures are presented in chapter 4 "Operation".

#### 3.1 Mechanical Groups

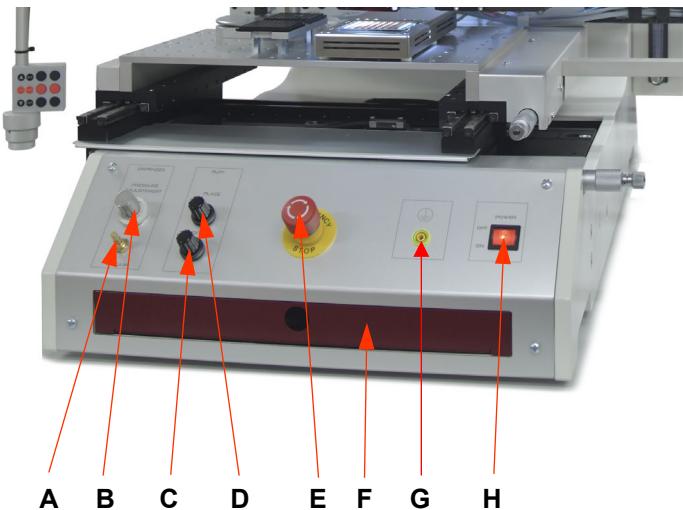
- Pick & Place arm
- Wafer table
- Flip-Chip (Option)



- A Z-Drive Cover
- B Pick & place arm (Z-movement)
- C Remote Control Panel
- D Positioning knob spindle rotation
- E Front panel with emergency stop

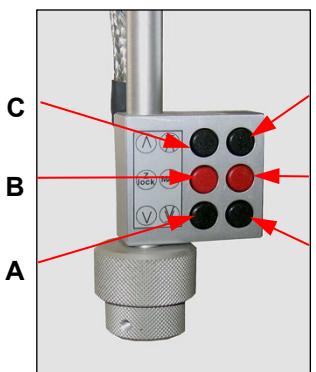
- F XY-Work table
- G Rotatable spindle with Pickup tool
- H XY-Work table terminal
- J XY-Work table arm with release button
- K Flip-Chip (Optional)

### 3.2 Front Panel with Emergency Stop



- A** Dispenser vacuum regulator (Venturi system)
  - B** Dispenser Air Pressure regulator
  - C** (Puff) Blow through regulator before Pick
  - D** (Puff) Blow through regulator after Place
  - E** Emergency Stop
  - F** Drawer with PC keyboard
  - G** ESD Plug
  - H** Main Power Switch
- (value displayed in T-Suite Software)  
 (value displayed in T-Suite Software)  
 (value displayed in T-Suite Software)

### 3.3 Remote Control Panel



Buttons **A - F** have multi functions depending on mode and program. The functions described below are the most common ones as a general overview.

- A** Movement down in single steps
- B** For switching between manual and automatic
- C** Movement up in single steps
- D** Start Z drive reference sequence after main power switch ON
- E** Switching ON/OFF of main mode function
- F** Z-Movement to the next pre-selected height or bonding force

All described functions are in relations with the Joystick-functions described in **4.5 Joystick**

## 4 Operation

This chapter "Operation" describes how the T5300 is set up for production and adjusted for different procedures.

**The machine must be set up and operated only by authorized and trained personnel. The reading and understanding of this manual is an integral part of qualification and training of authorized personnel.**

### 4.1 Overload Protection

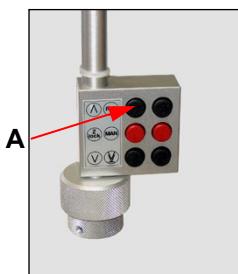
For the machine and the operator's safety the T-5300 is equipped with 2 types of safety stops.



**Do not insert hands into the work area of the moving Pick & place arm!  
This may cause an unexpected collision or start to jam the operator's hand!**

#### 1. Safety stop

When a safety stop is triggered, the machine interrupts the actual work step.



- Remove the obstacle that caused the safety stop.
- To perform the interrupted work step from this start position, press button A to move arm up from collision.

#### 2. Servo / Touchdown Sensor Error (Machine Status)

The general status of the machine is indicated by the first button/icon of the operation mode toolbar. Depending on the actual state of the machine, the icon's color will change, accordingly. Furthermore, any warnings/errors are usually made visible by a respective entry in the log view.

OFF	ON	WARNING	ERROR	
<ul style="list-style-type: none"> <li>• Z-motor disabled</li> </ul>	<ul style="list-style-type: none"> <li>• Z-motor enabled</li> <li>• Machine homed</li> </ul>	<ul style="list-style-type: none"> <li>• Z-motor enabled</li> <li>• Machine unhomed</li> </ul>	<ul style="list-style-type: none"> <li>• Z-motor disabled</li> </ul>	<div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p> <b>Error Acknowledge</b> Note that some, but <b>not all possible SW- and machine-errors</b> are "self acknowledging". That is, <b>in some situations it is necessary for the user to explicitly acknowledge an existing error</b>. This is done by clicking the machine status button and usually causes the Z-motor to be disabled and reenabled again.</p> </div>

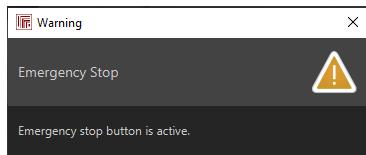
For guaranteeing safe operation, the **TSM** software needs a robust and stable (Ethernet-)connection to the main hardware controller all the time. Therefore, the connection is permanently monitored in the background by an internal "connection watchdog".

**Connection Problems**

In case of connection problems, the watchdog reacts by **immediately (emergency-)stopping and disabling all motorized axes**. The machine status will change to "ERROR" and a respective [error message](#) will be printed to the [log](#). Please note **that no further operation with the TSM software is possible in such a situation**. That is, for safety reasons **the TSM application needs to be shutdown and restarted**. Check that the hardware controller is powered properly and the Ethernet connection to the controller present. Try to reboot the whole system and check if the problems still exist.

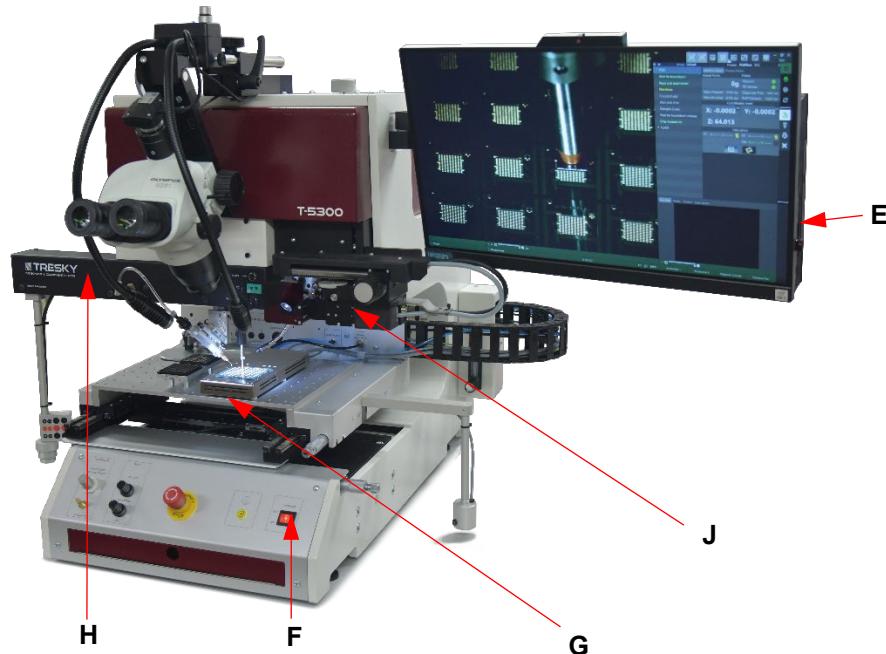
### 3. Emergency Stop

TSuiteM monitors the emergency stop button all the time. In case the button is triggered, motor power is cut off and a respective warning message will appear on the screen.



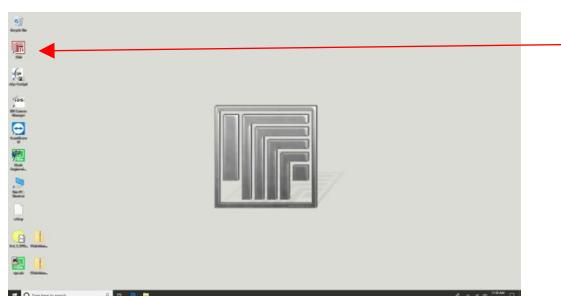
Note that the dialog will close automatically as soon as the emergency stop is released again. That is, for safety reasons [it is not possible to manually close the warning dialog](#).

## 4.2 Switching the Machine ON, Conditions



For proper start up, follow the listed steps:

- F Switch ON Machine (red LED indicates ON)
- E Switch ON PC
- G XY-table must be at the rear Y stop position.
- H Pick & place arm is lifted and hold in its top position manually.
- J Flip-Chip (Option) must be in the Left and Top position



TSM-Icon to start the T-Suite Software

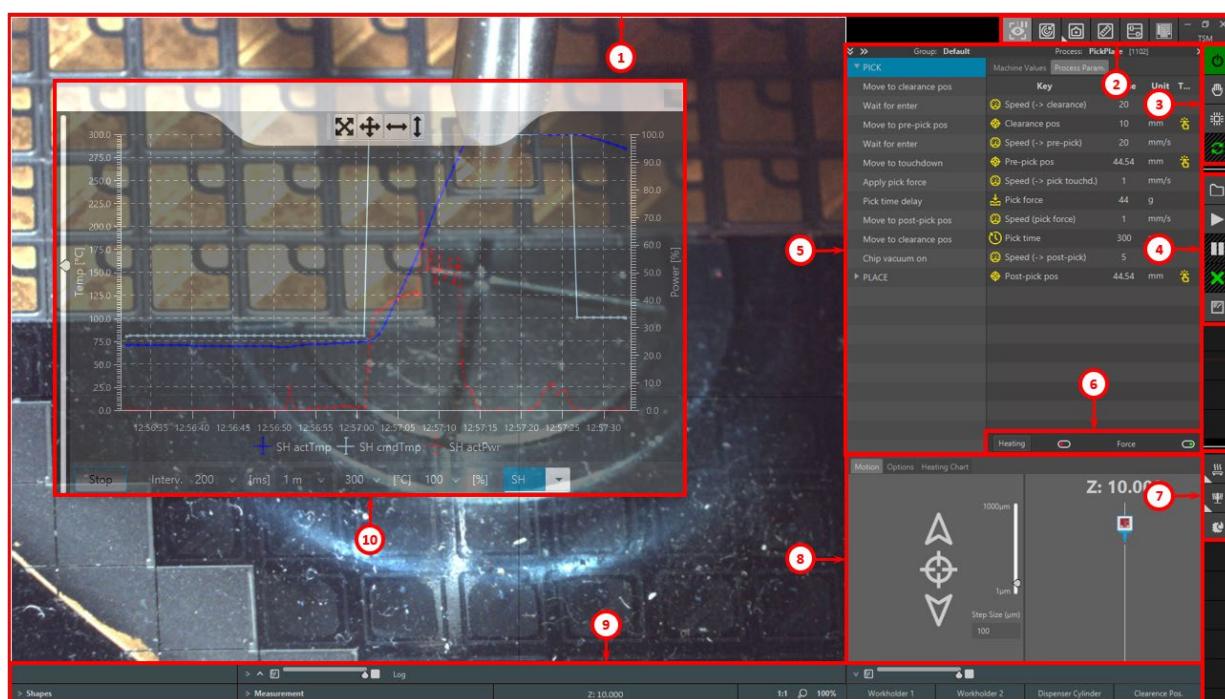
### 4.3 Software T-Suite Manual (TSM)

T-Suite Manual (TSM) is a pick-and-place software-application for TRESKY's manual die bonders based on Tresky's TreskySuite SW-Platform.

**The following description, of the T-Suite Software, is a basic overview of it.  
For detailed instructions use the separate [T-Suite v2.0 Operation Manual](#) (or newer).**

T-Suite Manual was developed for and tested on standard (consumer-)PCs and runs on Windows 7 (64bit) and Windows 10 (64bit) operating systems

#### Main User Interface (UI)



	Element	Description
1	<b>Main View</b>	Displays the video image of the main camera. Acts as container for all other views.
2	<b>Main Toolbar</b>	Contains "main" functions/buttons for camera control and other features. Includes UI controls for window handling.

##### Window Handling

You can resize the **T-SuiteM** application window normally in its width and height at each four corners. For moving the window around, grab it at the "**TSM**" label (red marked area below).



	<b>Element</b>	<b>Description</b>
<b>3</b>	<b>Operation Mode Toolbar</b>	Contains buttons for operation mode selection ( <i>manual-, library-, auto-mode</i> ) and an indicator for the machine status which also acts as button for enabling the Z-axis.
<b>4</b>	<b>Context Toolbar</b>	Shows "context"-dependent functions/buttons (e.g. Start/Stop in auto-mode).
<b>5</b>	<b>Process View</b>	Shows process related information ( <i>sequence of execution, process parameters</i> ).
<b>6</b>	<b>Process Options</b>	Contains process option switches (e.g. force control on/off).
<b>7</b>	<b>Heating Toolbar</b>	Contains buttons for manually <a href="#">controlling the individual heating units</a> .
<b>8</b>	<b>Support View</b>	Incorporates several tabs with different supporting functionality (e.g. Motion Joystick, Auxiliary Camera, Options, Beam Splitter ...).
<b>9</b>	<b>Statusbar</b>	Displays status information (e.g. measurement, zoom ...). Contains supporting views like the <a href="#">Log View</a> .
<b>10</b>	<b>Heating Chart</b>	Shows the <a href="#">Heating Chart</a> in "undocked" state. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <b>✓ Undocked Heating Diagram</b>            The opacity of the undocked window can be adjusted by the slider in the far left part of the window.            Using the heating chart in undocked state with reduced opacity allows it to view the main camera picture and monitoring the heating temperature and power at the same time.            Closing the undocked heating chart window via "X" button brings the chart back to the support view panel.         </div>

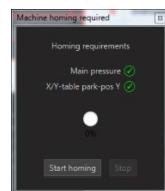
## 4.4 Homing

Whenever the machine is powered up the first time (e.g. *after a weekend*), the hardware controller must first perform a "homing/initialization run".



Press to start homing Sequence

This brings the motors in a well-defined position (*by searching for the homing limit switch and init marker, resp.*) and prepares the system for operation.



**✓ Homing Start**

In order to open the homing dialog (shown on the left), click on the "Machine Status Button/Icon" on the [operation mode toolbar](#). If all homing requirements are met, the "Start homing" button will be enabled for starting the homing run. Alternatively, you can push the "REF/SET" button on the console (note that this only works if the homing dialog is already open).

**✗ Homing Requirements**

In general, it is not possible to operate the machine/motors in unhomed state. Furthermore, homing itself can only be started/finished if the respective homing requirements are met. Depending on the given circumstances (*machine configuration and installed options*), these requirements may vary. If conditions change after homing start but before the initialization was finished, all movements will immediately be stopped. A new homing run can be started not before all homing conditions are fulfilled again.

Note that, once homing was successful, the procedure doesn't need to be executed again unless the hardware controller is rebooted. That is, even if the **TSM** software is shutdown/restarted, a new homing will only be required if the power to the hardware controller is cut off (e.g. by shutting down the whole machine).

## Homing Requirements

### ! Homing Requirements

In general, it is not possible to operate the machine/motor in unhomed state. **Homing itself can only be started if the respective homing requirements are fully met:**

#### (1) Z-axis handle



**It is critical that the Z-axis handle is put into its uppermost position before starting the homing run!**

Usually the handle is dragged to the top automatically. However, depending on the counterweight adjustment, a small gap might still exist which needs to be closed by the user by slightly pushing the handle to the top.

Note that, if the homing run is performed with the handle in an incorrect position, a permanent Z-axis position offset might result which can lead to wrong Z-axis positions or unexpected limit switch errors, making a new homing run necessary (see "Z-Axis Limit Switch Monitoring" below).

#### (2) Further requirements

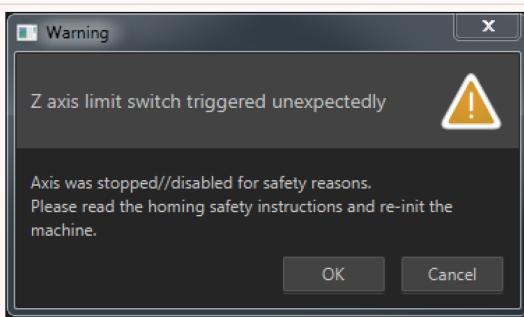
Depending on the given circumstances (*machine configuration and installed options*), the homing requirements may vary. If conditions change after homing start but before the initialization was finished, all movements will immediately be stopped. A new homing run can be started not before all homing conditions are fulfilled again.

Note that, once homing was successful, the procedure doesn't need to be executed again unless the hardware controller is rebooted or the (*upper*) limit switch triggers unexpectedly (see explanation below). That is, even if the **TSM** software is shutdown/restarted, a new homing will only be required if the power to the hardware controller is cut off (e.g. by shutting down the whole machine).

## Z-Axis Limit Switch Monitoring

### ! Z Axis Limit Switch Monitoring

The Z-axis (*upper*) limit switch is being observed for unexpected triggering as additional safety measure. This is necessary to prevent the Z-axis from moving beyond the limit switch and possibly into the mech. limit.



The limit switch monitoring is only active AFTER successful homing was performed once (that is, the monitoring gets active directly after the homing run finished).

In case the limit switch is triggered unexpectedly, the Z-axis is stopped/disabled and a respective warning message issued (left picture). If this happens, a new machine homing run needs to be initiated by the user due to safety reasons for being able to operate the machine again!

## 4.5 Touch Down Sensor

For avoiding mechanical damage to the head, tool and other related components, the touchdown sensor is monitored all the time for any forbidden/unexpected state change. By default (*i.e. no touchdown*), the sensor state is "high/enabled", whereas in touchdown, the sensor state changes to "low/disabled".

In general, a trigger to "low/disabled" state of the sensor **is only allowed in certain situations/circumstances**:

- When **searching for the touchdown** position (*process execution*)
  - When **applying force** (*process execution*)
  - If the Z-axis is **in standstill**
  - If the Z-axis is **moving upwards** (*i.e. with any negative speed*)
  - If the Z-axis is **moving downwards/positive at reduced speed** (*e.g. < 5.0 mm/sec*)
- Step Mode**



### Touchdown Sensor Error

In case the sensor triggers to "low/disabled" state in a different situation than the ones listed above, **a touchdown error is reported**. As a safety measure, **the Z-axis will automatically be stopped and disabled**. In such a situation, **the error must be acknowledged by the user explicitly by clicking the machine status button** (*disables/reenables the Z-motor*).

## 4.6 Operation Mode Toolbar

UI	Description
	<p>The operation mode toolbar contains a single "<b>Machine Status Button/icon</b>" on top and three buttons for <a href="#">changing operation modes</a> (<i>manual-, library- and auto-mode, resp.</i>). The left image of the toolbar shows manual mode being currently active. The machine status button combines several functions in a single UI control:</p> <ul style="list-style-type: none"> <li>• Displays the <a href="#">current status of the machine</a></li> <li>• Used for motor enable</li> <li>• Used for opening the <a href="#">homing dialog</a> (on first enable)</li> <li>• Used for <a href="#">error acknowledge</a> (<i>i.e. by disabling/reenabling the motors</i>)</li> </ul>

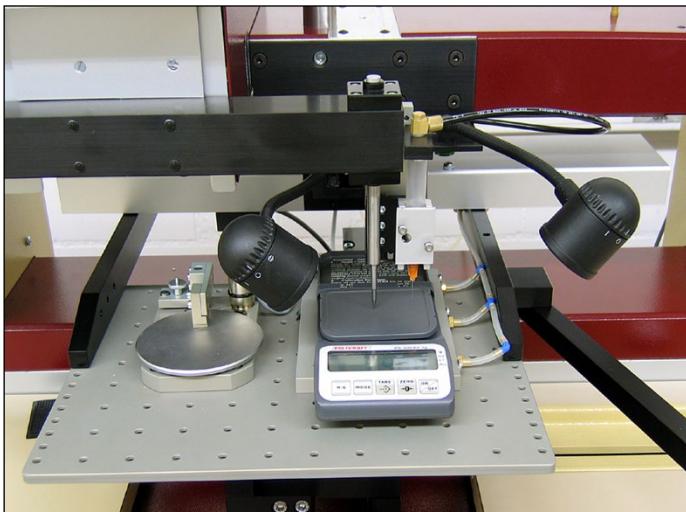
## 5 Maintenance

#	UNIT	ACTION	PERIOD	REMARK
1	Pick & place spindle	Check if the spindle is falling down by its own weight until its mechanical stop	Weekly	If not, then dismount and clean the inner spindle and check that it is not bent
2	Touchdown sensor	Check that every time the spindle is down to its mechanical stop, the touchdown sensor red LED is highlighted	Weekly	If not, readjust the touchdown sensor
3	Global machine	Clean the machine to remove dust, debris of chips and residues of glue	Monthly	
4	Flip-Chip camera	Check that the Flip-Chip camera calibration is correct	Monthly	If not correct, then re-calibrate
5	X Y work table	Check the X Y work table Tilt by measuring the touchdown height at several locations	Quarterly	If out of tolerance, then readjust the X Y work table Tilt
6	6 buttons panel	Check that each of the 6 buttons is switching well	Quarterly	If not, change the 6 buttons panel
7	Substrate holder	Check that the substrate holder Tilt is correct	Quarterly	If not correct, then readjust
8	Force	Check that the force result is according to the programmed values within the tolerance	Quarterly	If out of tolerance, then first check the others points related to the spindle and after recalibrate the force
9	X Y Z cross roller bearings	Check the smoothness of the X Y Z slides	Yearly	If not smooth, then clean with ethanol and lubricate with Schneeberger oil
10	Z axis	Check perpendicularity of Z axis with X & Y axis	Yearly	If out of tolerance, then readjust
11	Pick & Place arm	Check spindle perpendicularity with X slide	Yearly	If out of tolerance, then readjust the pick & place arm
12	Theta belt	Check that the Theta belt tension is correct	Yearly	If not correct, then readjust
13	Z belt	Check the Z belt tension	Yearly	If not correct, then readjust
14	Z drive	Check the smoothness of the Z leadscrew and of the Z cylindrical bearing	Yearly	If not smooth, then clean with ethanol and lubricate with Kluber Isoflex NBU 15 grease

## 5.1 Bond Force Calibration



The Service Configuration Area provides possibilities to configure/adjust different machine-options and related parameters. To access it, click on the "Service View"-button shown on the [About Dialog](#):

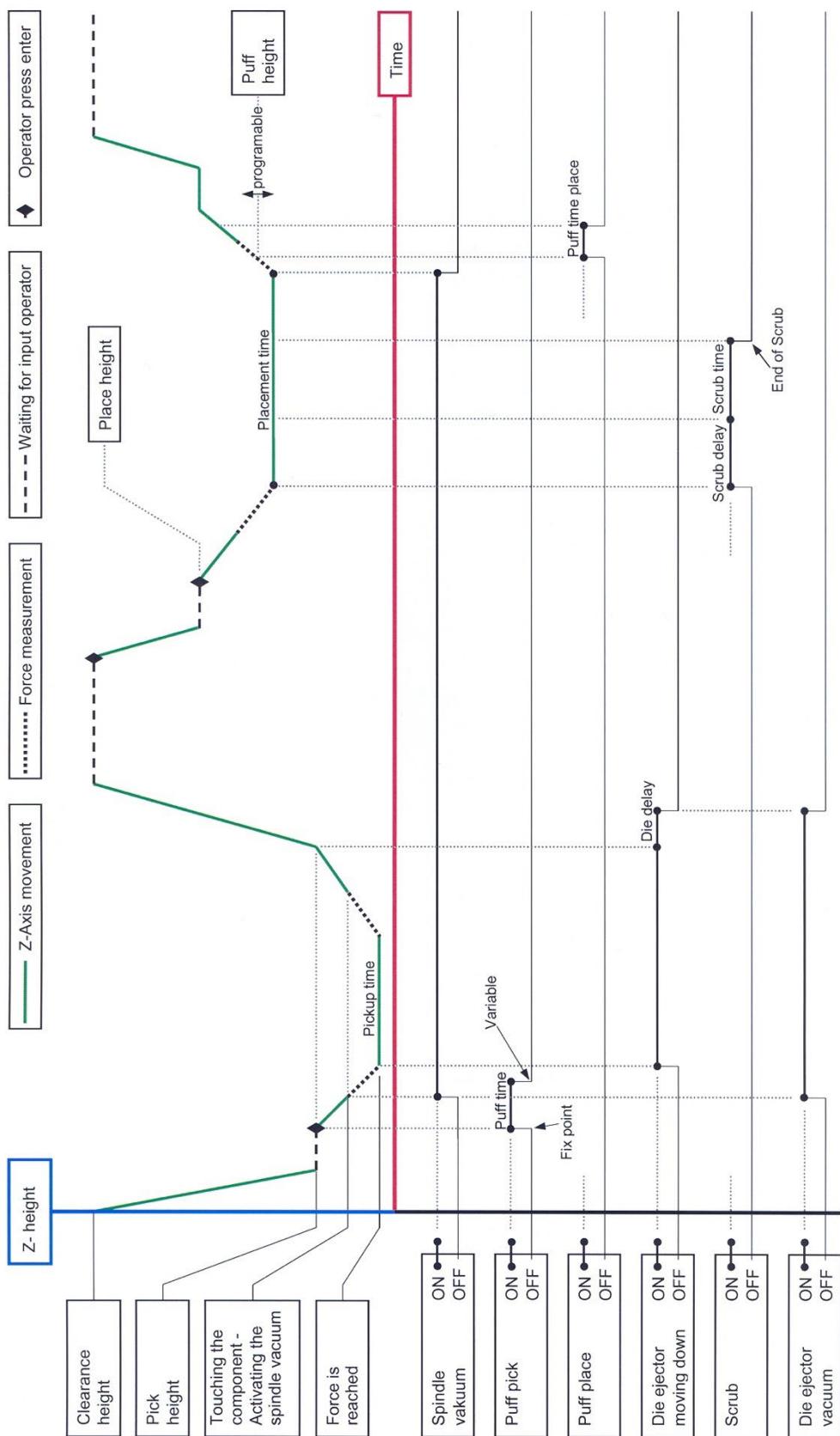


UI	Description
<div style="border: 1px solid red; padding: 5px;"> <input checked="" type="radio"/> Spring Force (Default)  <input type="checkbox"/> High Spring Force  <b>TD Sensor Offset</b> -0.1 mm         </div>	<b>1</b> <b>Table Selection</b> Selects the currently active/enabled overtravel table.
Overtravel (µm)      Force (g) 0                  20 120                30 230                40 350                50 440                60 550                70 640                80 720                90 840                100 920                110 1040              120 1120              130 1245              140 1330              150 1450              160 1540              170	<b>2</b> <b>Touchdown Sensor Offset</b> Defines the offset of the touchdown sensor mechanics.
<div style="border: 1px solid red; padding: 5px; text-align: center;">           Add    Delete    Sort            Refresh    Export    Import         </div>	<b>3</b> <b>Table Controls</b> Buttons for adding/deleting/sorting table rows or exporting/importing the whole table at once.  Refresh button checks and re-loads values from the database and reinitializes the force controller.

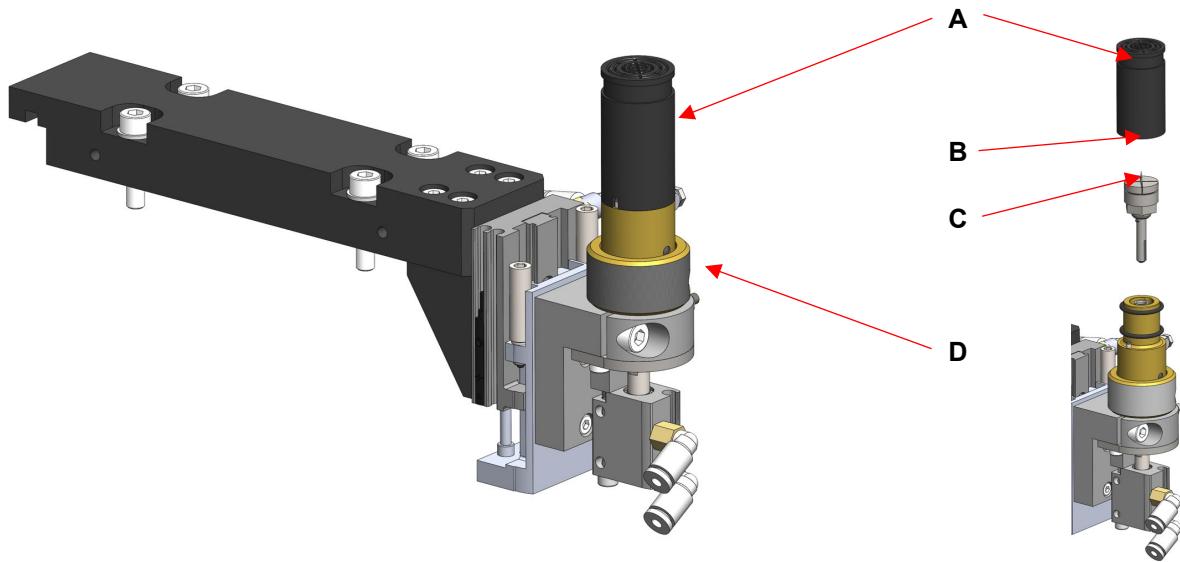

**Refresh**

Please note that **you need to press "Refresh"** for changes made to the table to get active. That is, **the software does NOT need to be restarted** after the changes but the values need to be "refreshed".

## 5.2 Pick & Place Diagram (Standard)



### 5.3 Adjustment of Die Ejector, Push-up Needle



The max. stroke of the barrel is approx. 2-3 mm and can be adjusted by the ring **D**. The clockwise rotation results in higher stroke.

The speed of the barrel can be adjusted by means of the valve in the front panel (chapter 3.2). The valve is very sensitive and a proper adjustment is important.

#### Exchange or inspection of the push up needle

- Remove the die ejector pepper pot **A**; by pulling up. Loosen the nutt **C** by a wrench supplied with the machine, and pull out the defective needle **B**.
- Insert the new needle in the bore.
- Use a piece of glass to push the needle **B** gently down until the tip concise with the orifice of the barrel.
- Tighten the screw and inspect the needle in microscope.
- Put the die ejector insert **A** very carefully in the barrel seat and inspect the tip of the needle again through the cross of the insert **A**.

## 5.4 Pick & Place Spindle



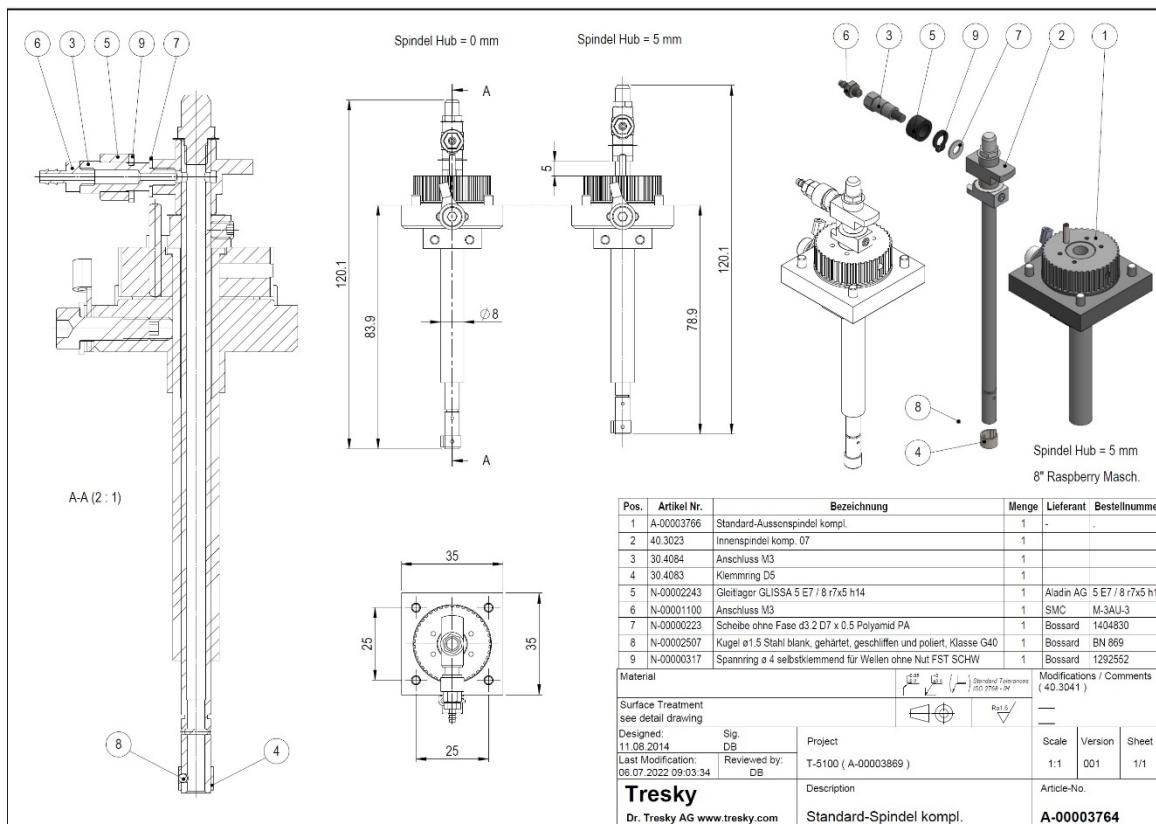
**No parts of the pick-and place axis may ever be oiled. It is important to keep the outer and inner (Pos. 1 & 2 in drawing A-00003764) spindle, the tool bore and tools clean. (The drawing may vary from the spindle is used in your system)**

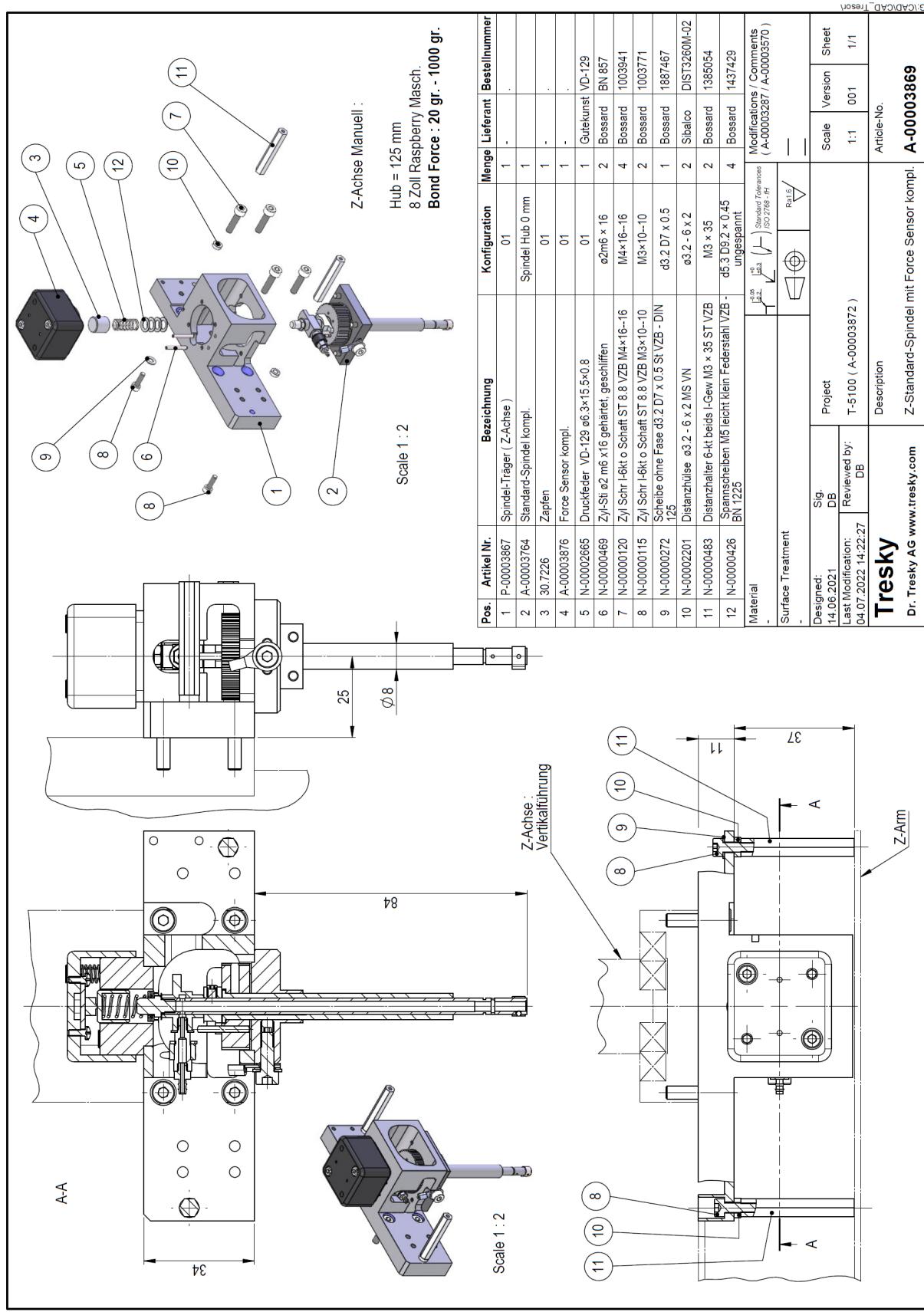
A smooth up and down sliding between the inner and outer spindle is absolutely necessary for a reliable operation of the machine.

The inner spindle with its flag must fall down by its own weight until the carrier. If this is not the case, the inner spindle must be cleaned or is bent and must be replaced. In this "lowest" position must the inductive sensor be switched by the flag. In the inductive sensor is a LED to indicate and can be seen by looking up (in direction of the arrow (14)) into the Arm (5). Is this not the case, the Arm will not move down by the buttons and can cause fault parameters on the "real force display".

The Inductive sensor should be adjusted so, that between the sensor and the flag is a minimum gap (max. 0.1mm) and when the inner spindle is lifted 0.2-0.3mm that the sensor LED switches off. The height of the sensor can be adjusted by loosen, level up/down, tighten the 2 screws and for the gap is the fixation screw located between the 2 screws. As soon this is adjusted, the spring, for the force compression, must be located on top of the washer. The top part should be adjusted so that it compresses the spring minimally or is a minimal gap.

Careless handling, particularly the movement of the XY-table when the Z-group is not in upper position can lead to irreparable damage to the spindle.



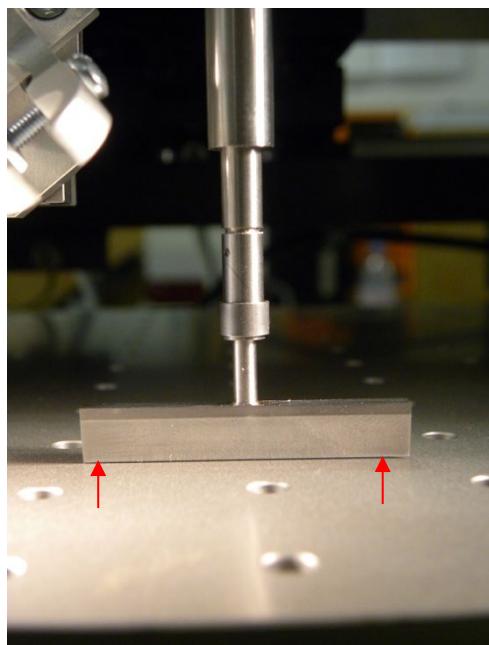


## 5.4 Pick and Place Arm

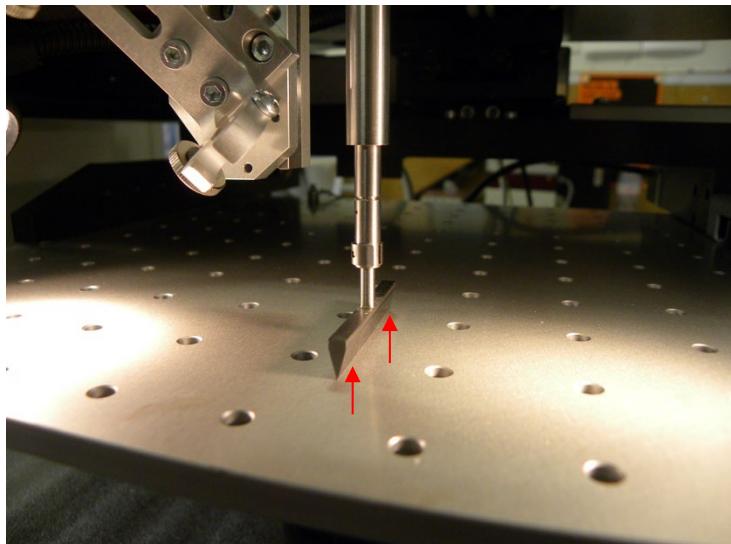
Further Information and description will follow

### T-5300 Z-Axis perpendicularity to the XY- work -table

Check the perpendicularity by pick-up of a, as large as possible, flat part (e.g.: ceramic substrate or medical/microscope glass) and move it down as close as possible to the XY-work-table. Observe the space between the picked-up device and table to control parallelism respective perpendicularity.

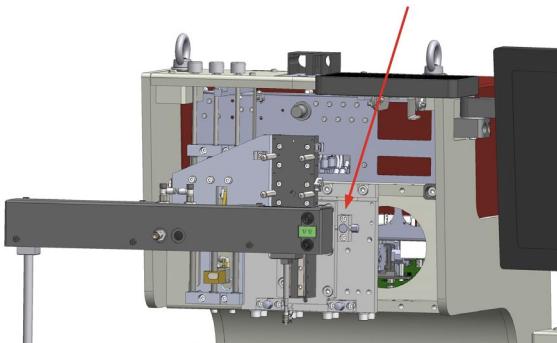


Option: Parallelism-Tool

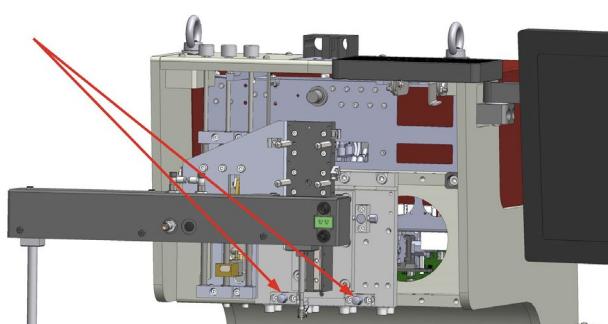


If they are not parallel than must be the Arm respective the Z-Assembly readjusted.

For X-Direction:



For Y-Direction:



## 5.5 XY-work table

A collision of the Pickup-tool with any part on the XY-work table, or the XY-worktable itself, may cause irreparable damage to the inner spindle and is therefore not covered by warranty!

## 5.6 XYZ-Linear Bearings

The linear bearings are the most important parts of the T-5300, but also the most sensitive. Easy movement and long life are a question of proper handling rather than the hours of service.

After operation, the XY-work table and the wafer table should be returned to their back-stop position and the machine should be covered with a hood, functioning as a dust protection.



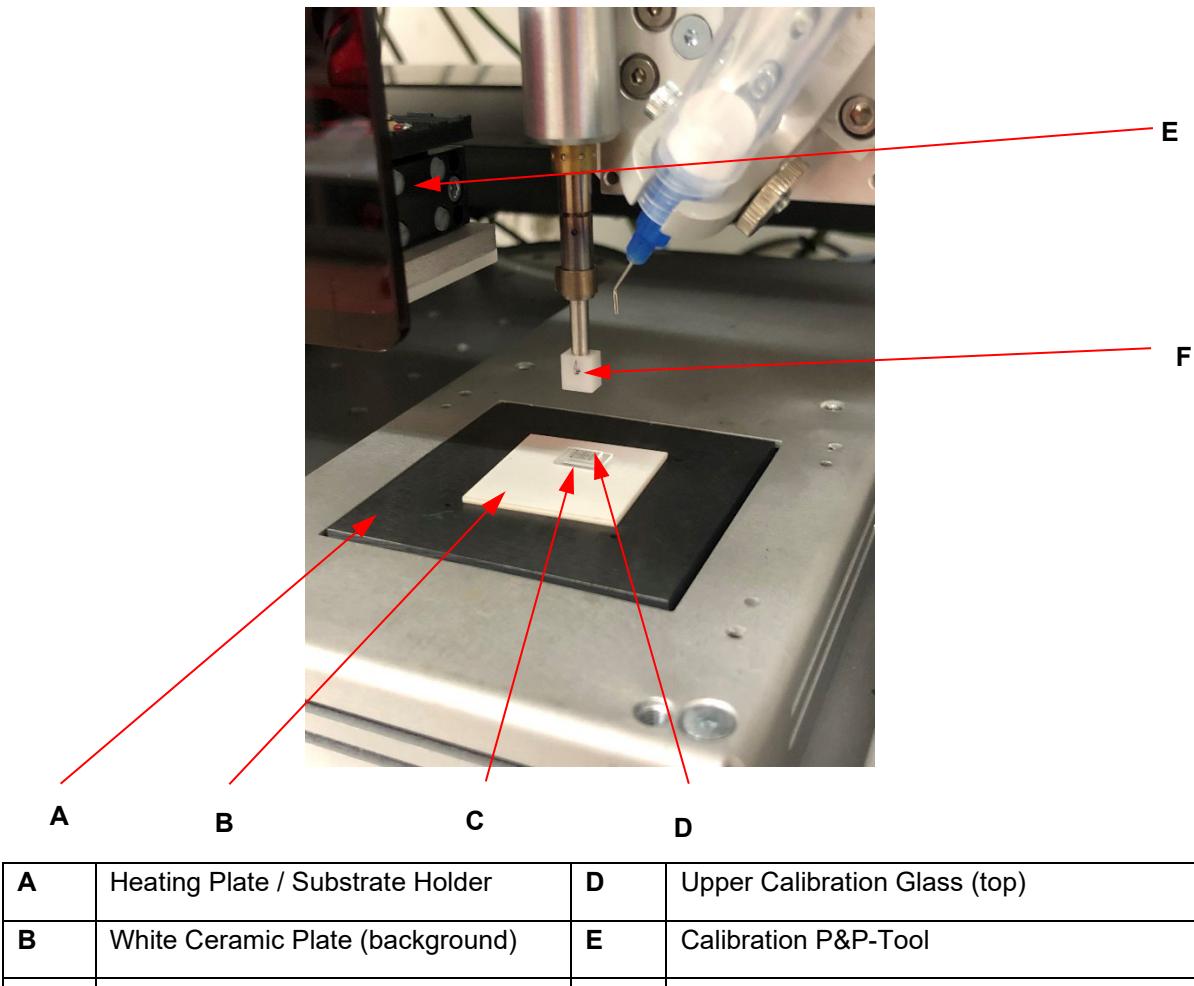
**Adjustment of the linear bearings (priestess) should be undertaken by authorized, qualified and trained personnel only.**

## 5.7 Flip-Chip Calibration

The Flip-Chip Optics assembly has been adjusted by DR. TRESKY AG technicians in Switzerland. After transportation the precise position of the Flip-Chip assembly needs to be checked and if necessary calibrated.

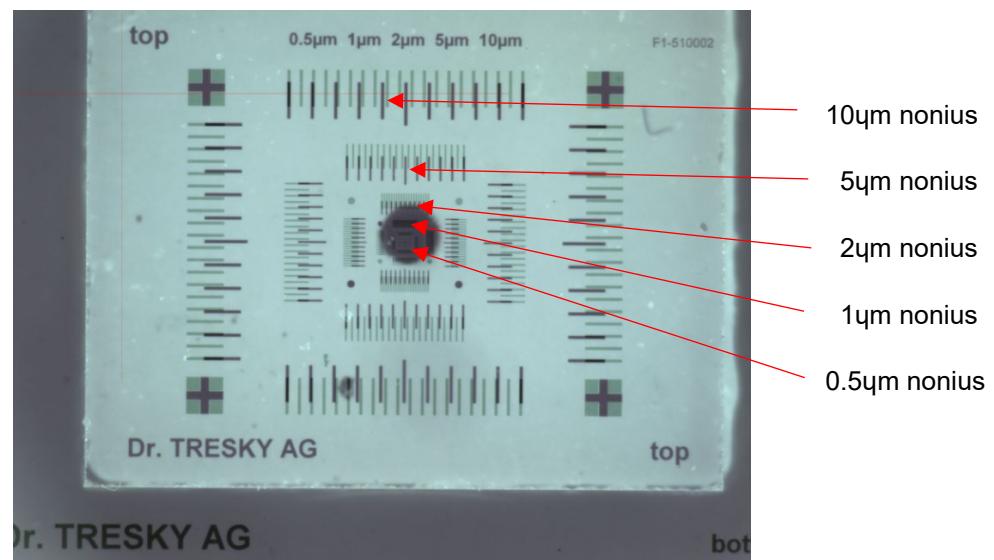
### Use of Calibration Glasses

A set of two calibration glasses is delivered with each Flip-Chip optics assembly.

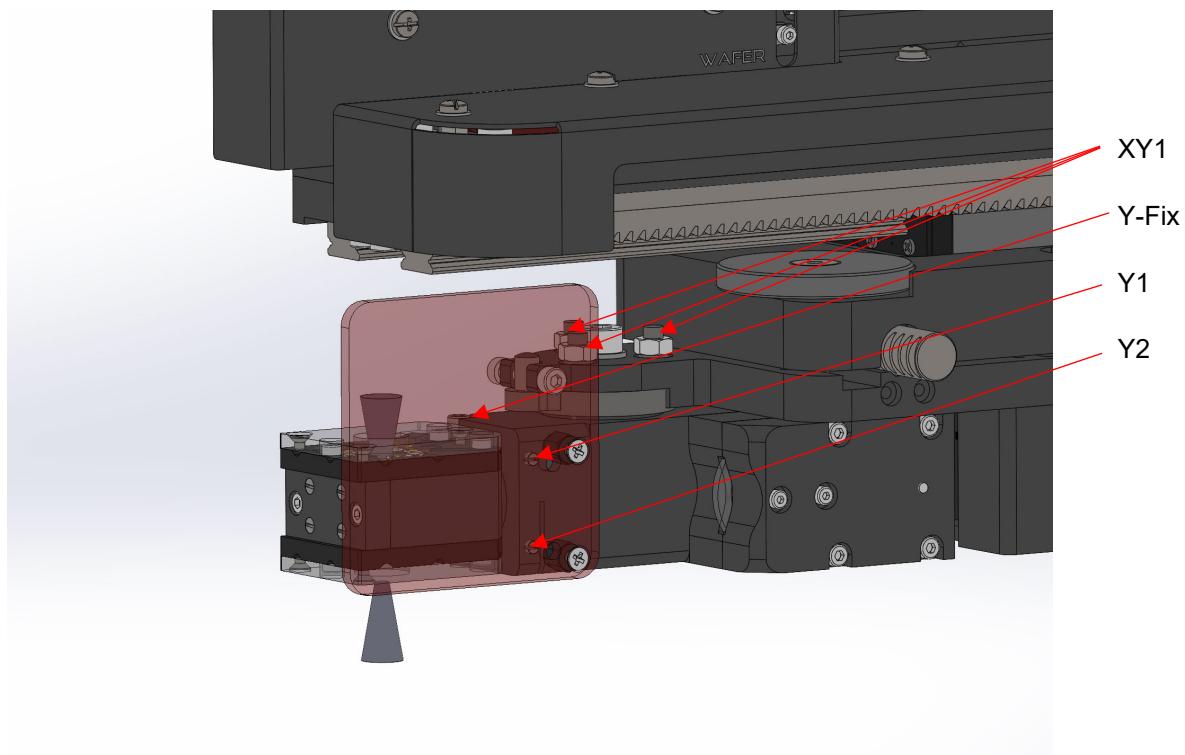


### How to Read the Calibration Glasses (Nonius/Vernier Scale)

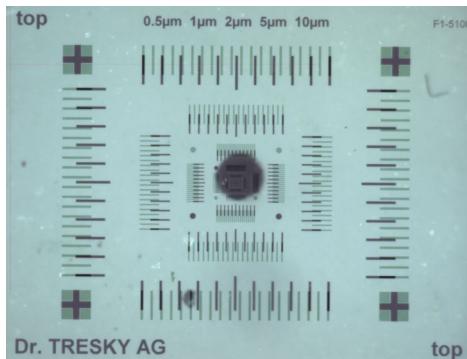
The vernier is a subsidiary scale replacing a single measured-value pointer, and has for instance ten divisions equal in distance to nine divisions on the main scale. The interpolated reading is obtained by observing which of the vernier scale graduations is co-incident with a graduation on the main scale, which is easier to perceive than visual estimation between two points. Such an arrangement can go to higher resolution by using higher scale ratios, known as the vernier constant.



### Calibration Procedure

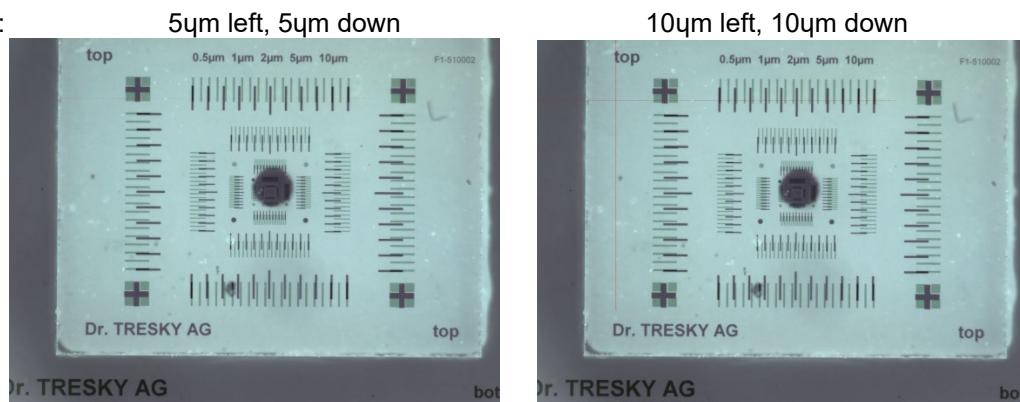


- Heating systems (if existing) are OFF and heating plate A is completely cold.
- Place the white Ceramic Plate **B** on the Substrate holder or Heating plate and the 2 calibration glasses **C** & **D** on top (so that all the marks on the calibration glasses can be readed).
- Pick up the upper calibration glass **D** (marked "top") with the calibration tool.
- Use the In/Out knob to drive the prism between the upper and lower calibration glass.
- Align the Calibration Glasses with the fine adjustment of the XY-worktable over each other, so that all outer nonius lines are aligned to each other.



- Remove the prism from the work zone into park position.
- Place the calibration glasses on each other.
- Verify the precision– offset with the Flip-Chip optic and mark the offsets (Don't move the XY-worktable)

E.g.:



- Re pick-up the "top" calibration glass
- Move the prism between glasses and the alignment of the glasses should be the same as before placement (ensures that there was no movement during placement).
- Loosen slightly **Y-Fix** screw. Adjust the placed offset with the **XY1** and **Y1**, **Y2** calibration screws from the top glass marks to the bottom glass with the same amount and direction as was marked at placement
- Align the glasses conformingly
- Remove the prism and set the glasses on each other
- Verify the glasses with the flip chip optics
- Repeat these steps until the offset is removed

## 6 Transportation

Short transportation of the T-5300 within the customers department should be undertaken with great care and on a trailer with rubber wheels.



**For longer transportation all XYZ guides have to be protected with cable straps and safeguards like seen in chapter 2.3.**

**Foamed packing material must be unbreakable and clean.**

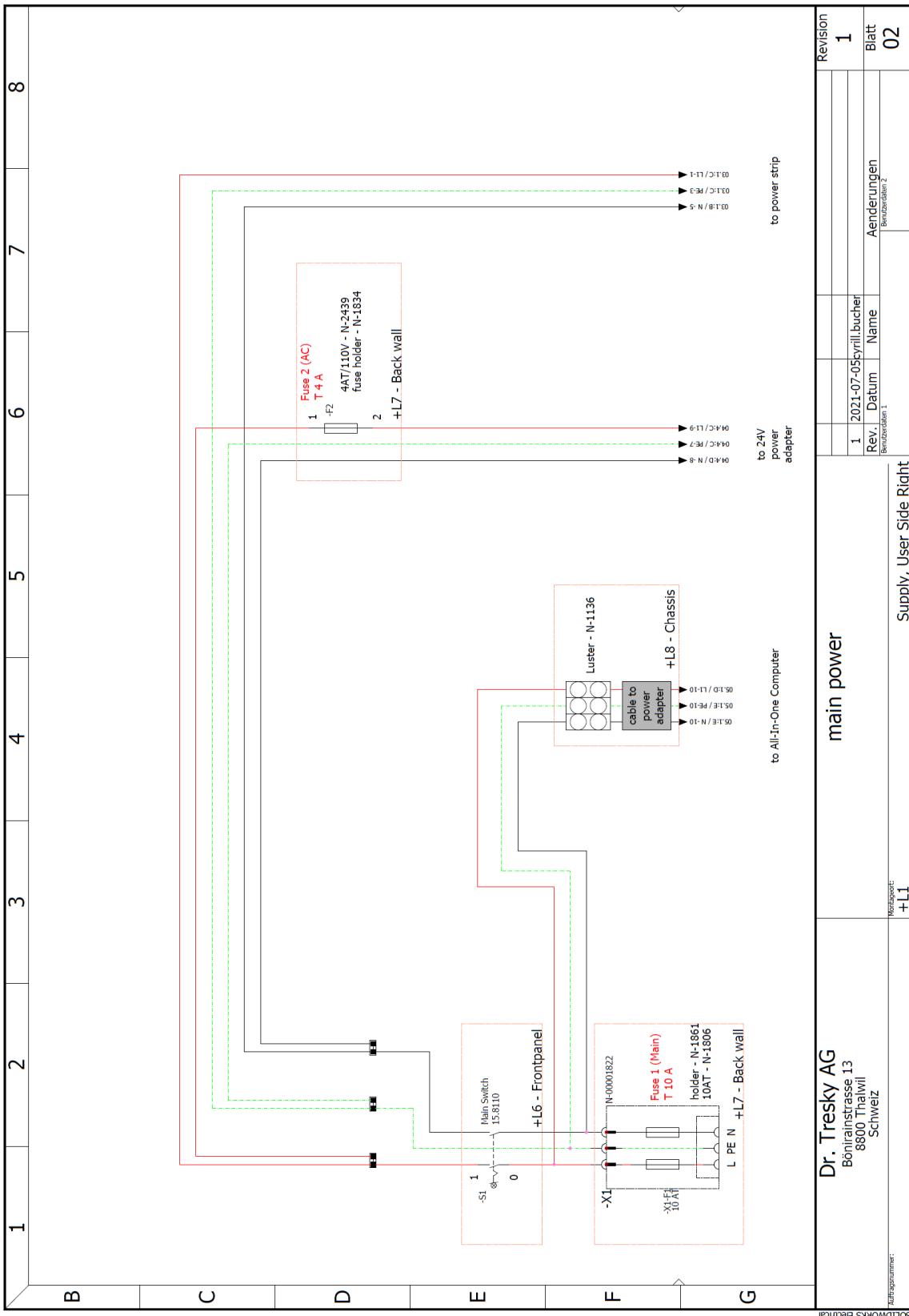
**The adhesive tapes used for packing, should have contact with the packing material only and not stick on any component or cover sheet!**

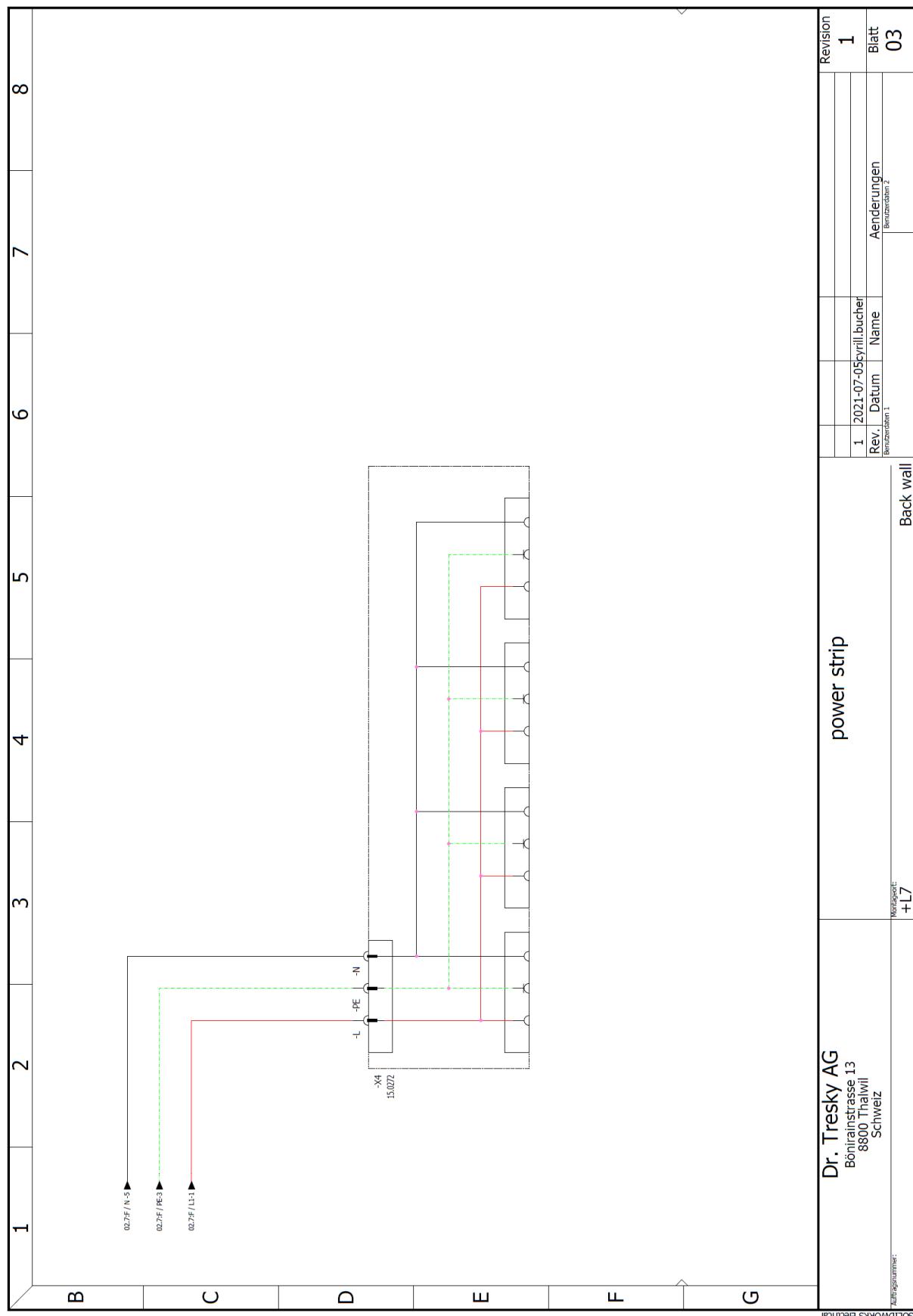
Dismount the components such as microscope, All-in-One-PC, Flip-Chip etc. carefully, pack each item into a plastic bag and place them individually into padded containers. Cables belonging to control elements have to be packed into plastic bags as well and for better identification, the bags should be labeled. The control elements have to be packed and protected in the same way.

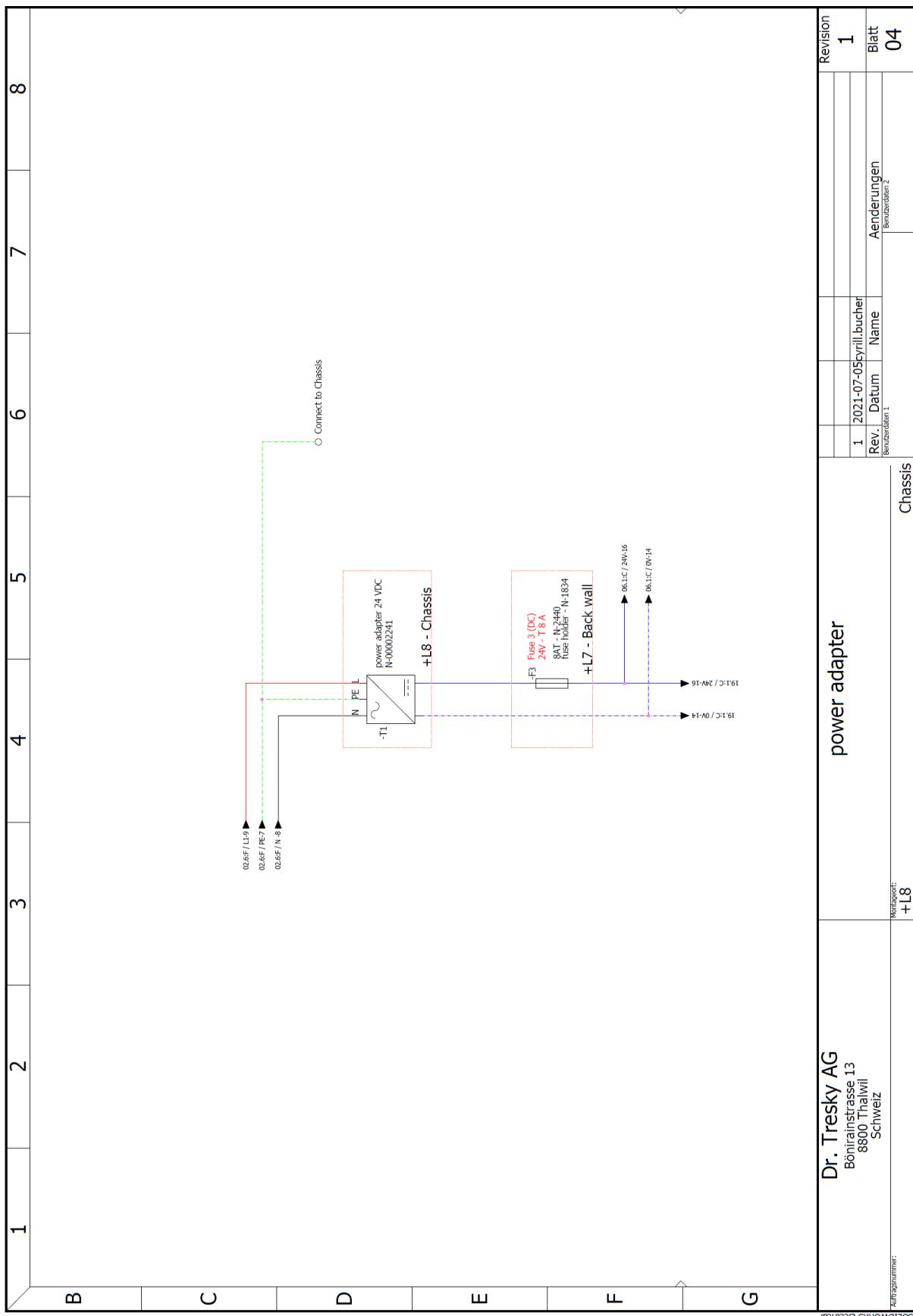
- The T-5300 has to be covered completely with a plastic foil, functioning as a hermetic dust protection.
- The machine has to be fixed tightly on a gap free palette. For save transportation use a closed, strong wooden box, covering the entire surrounding and the top of the machine.

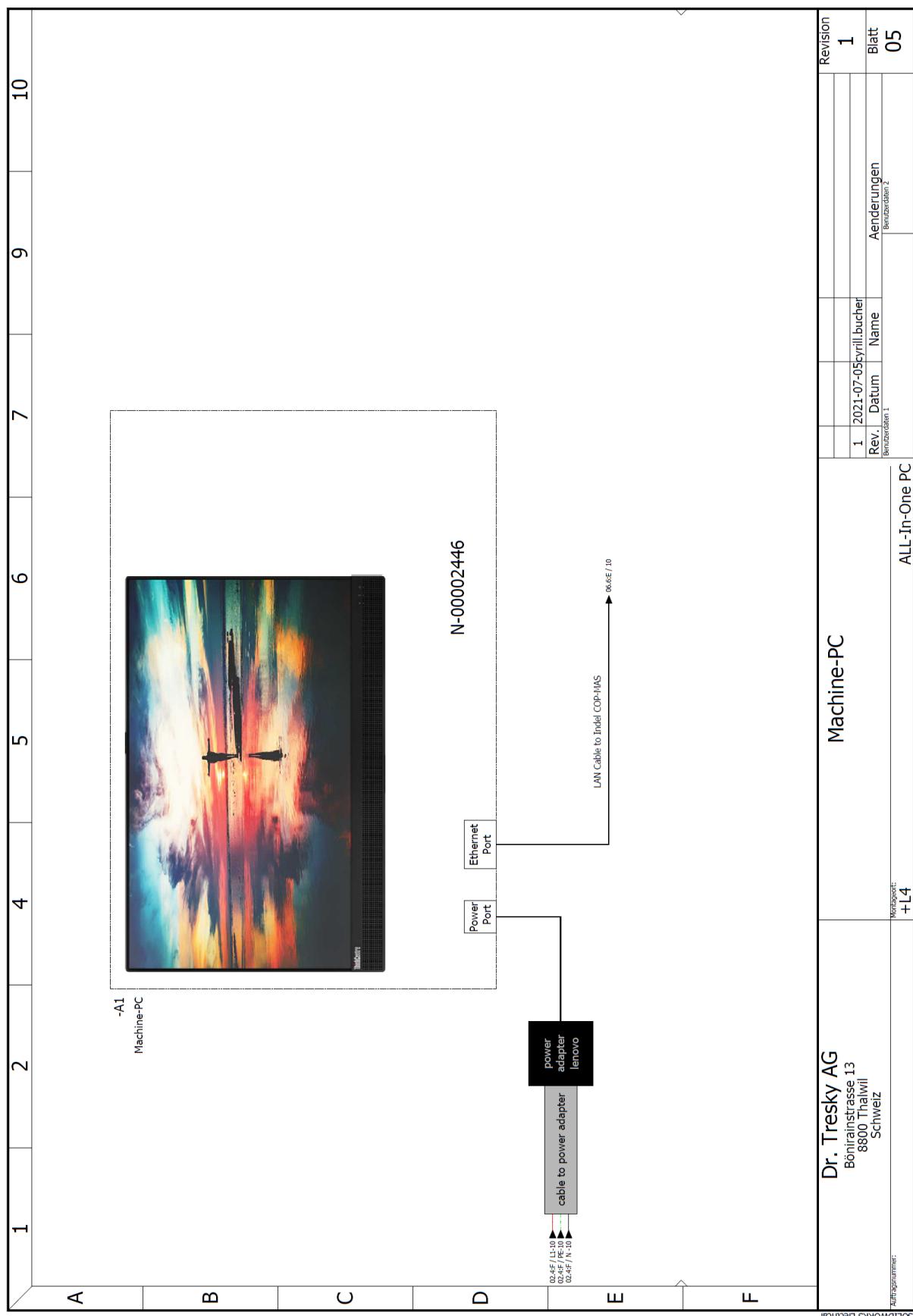
For proper packing, take notice of the national and especially the international transport regulations. For shipping over see, we recommend contacting an international cargo agent. For general transport information ask also Dr. TRESKY AG in Switzerland.

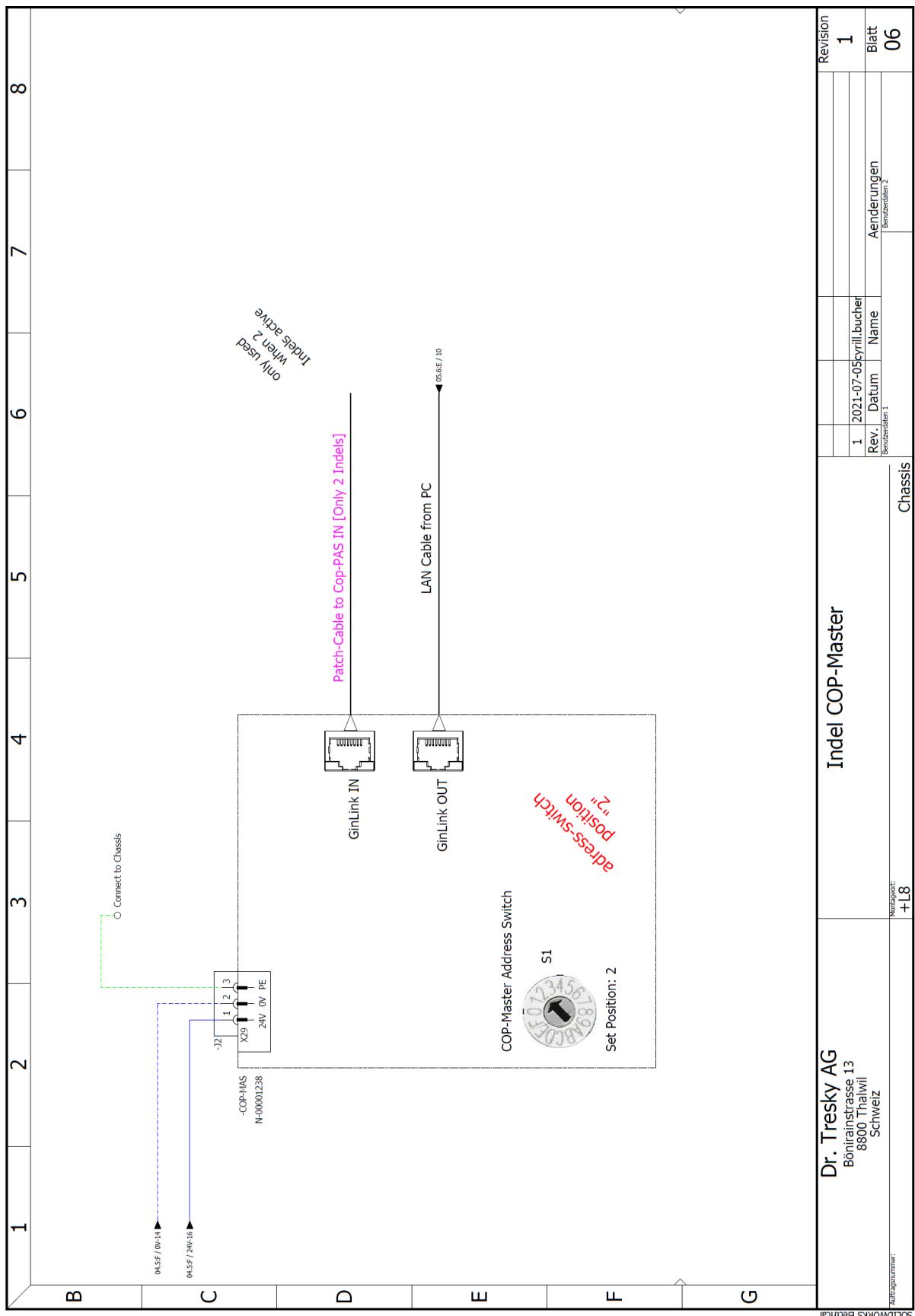
## 7 Schematic

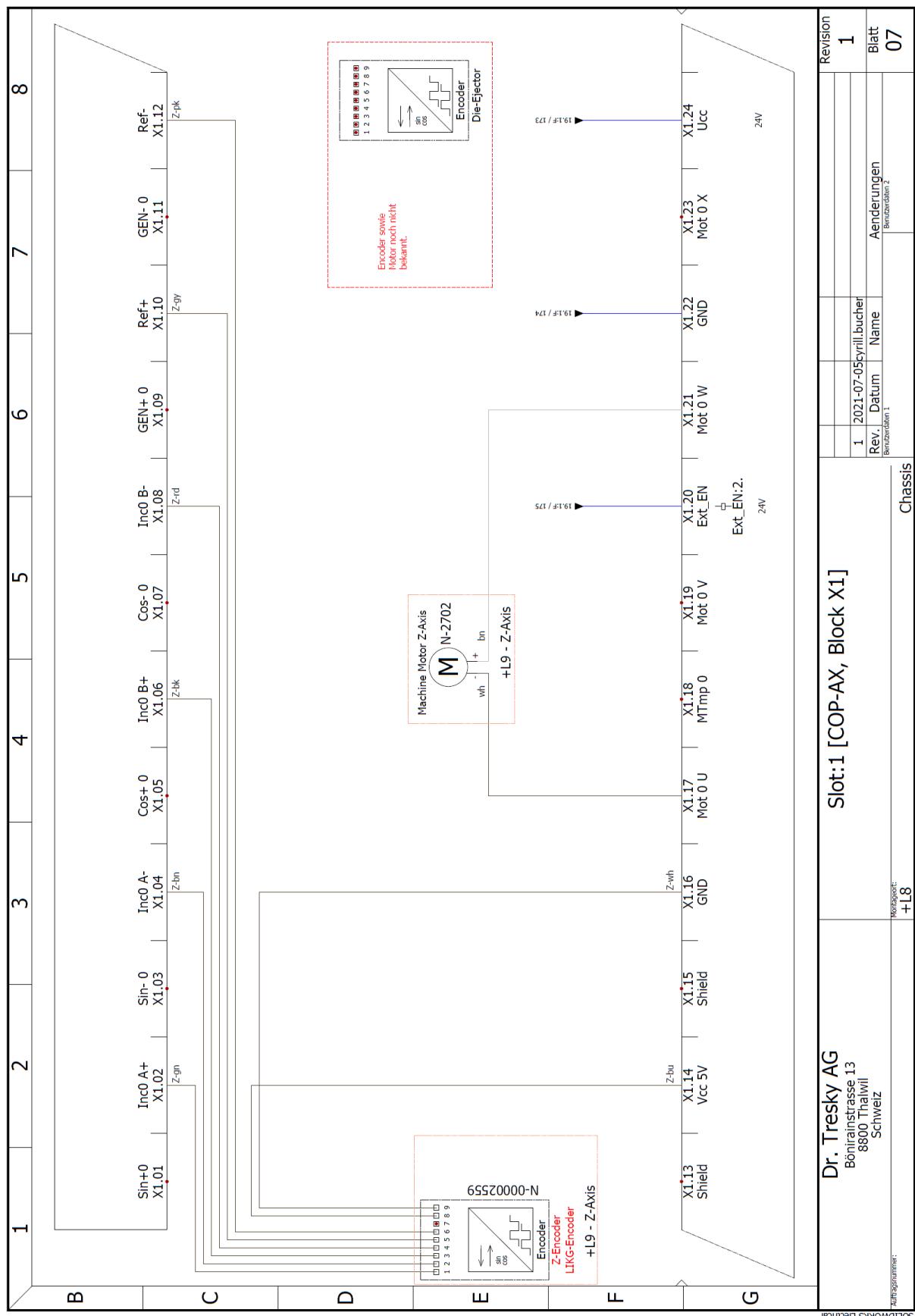






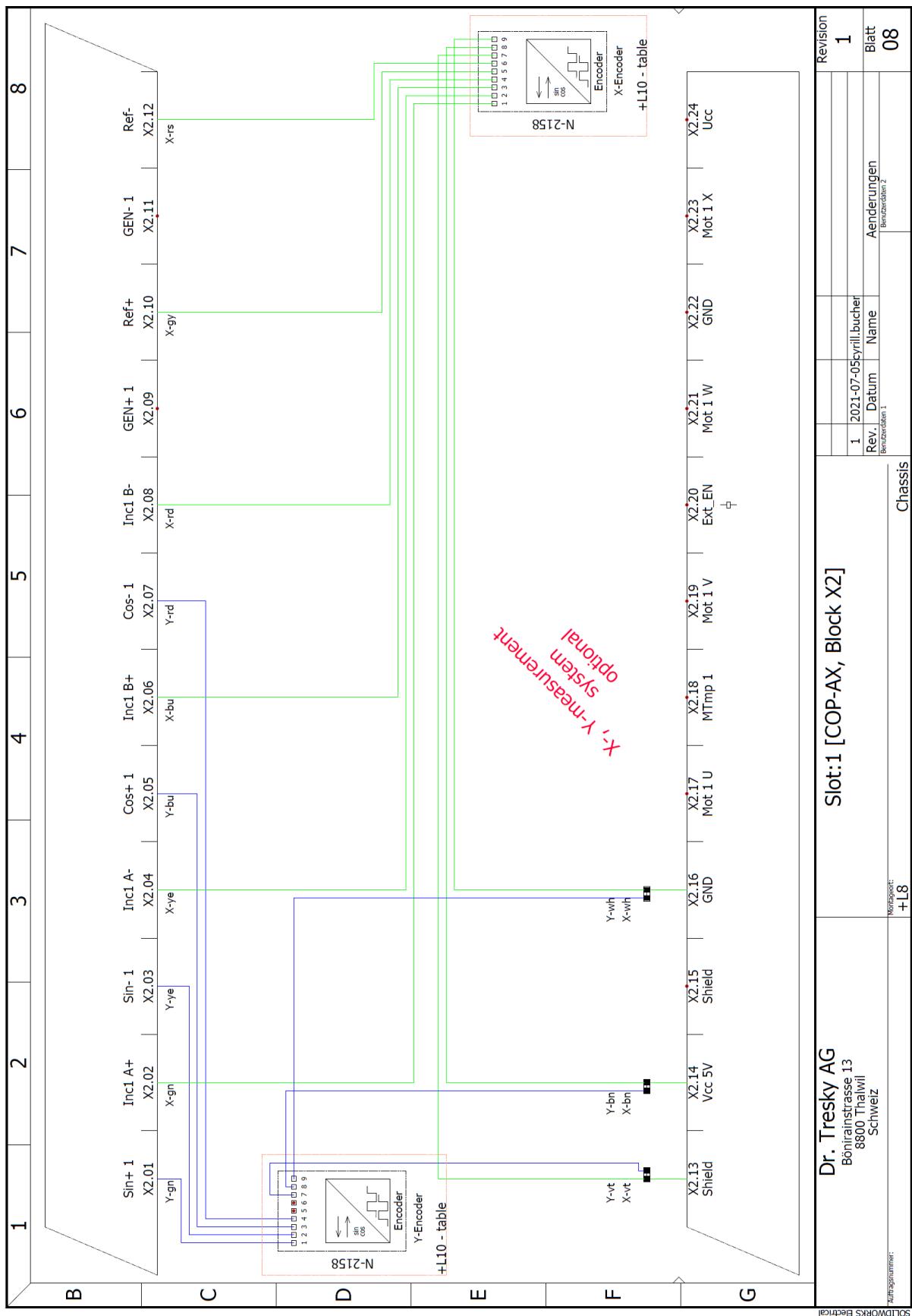


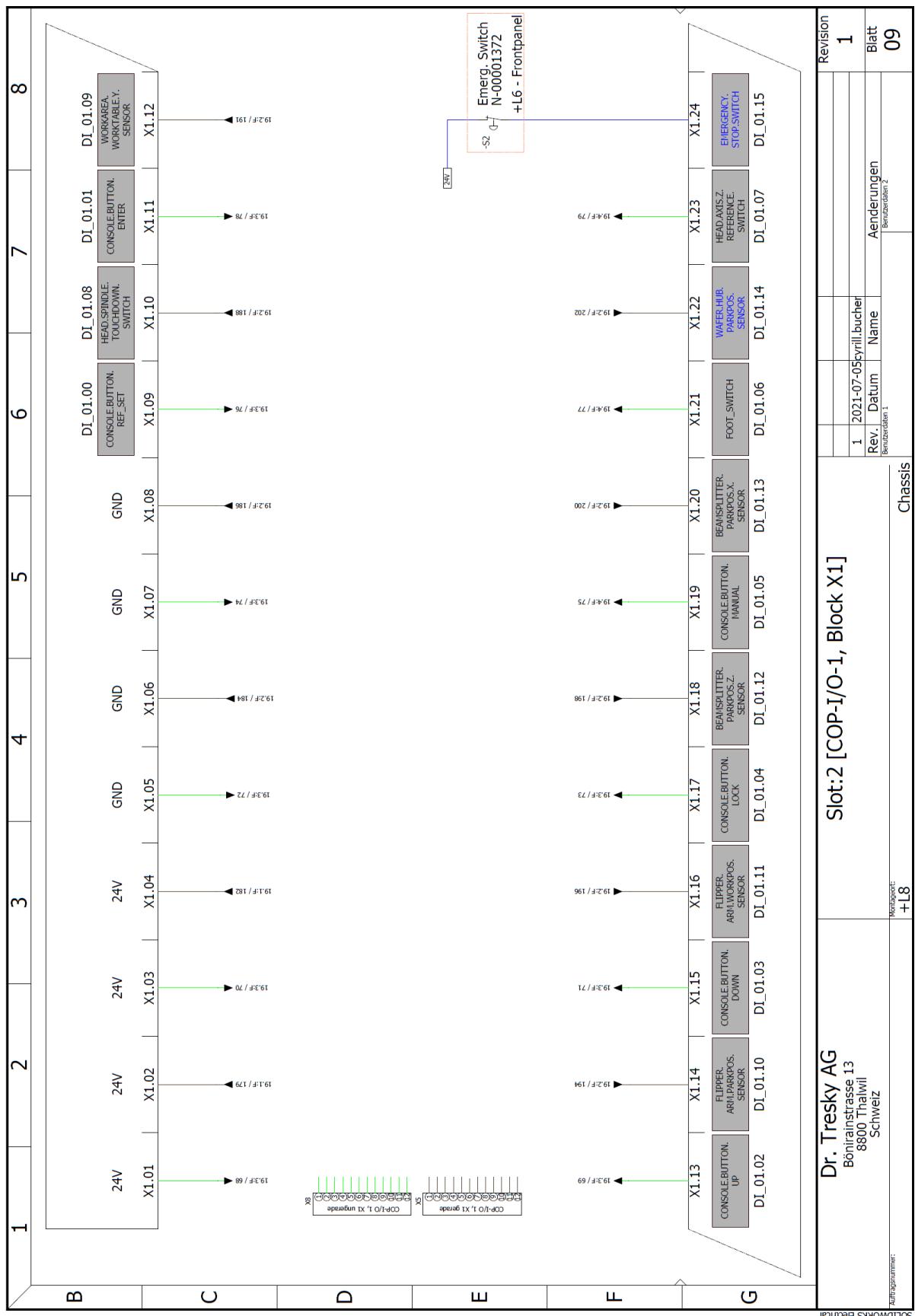


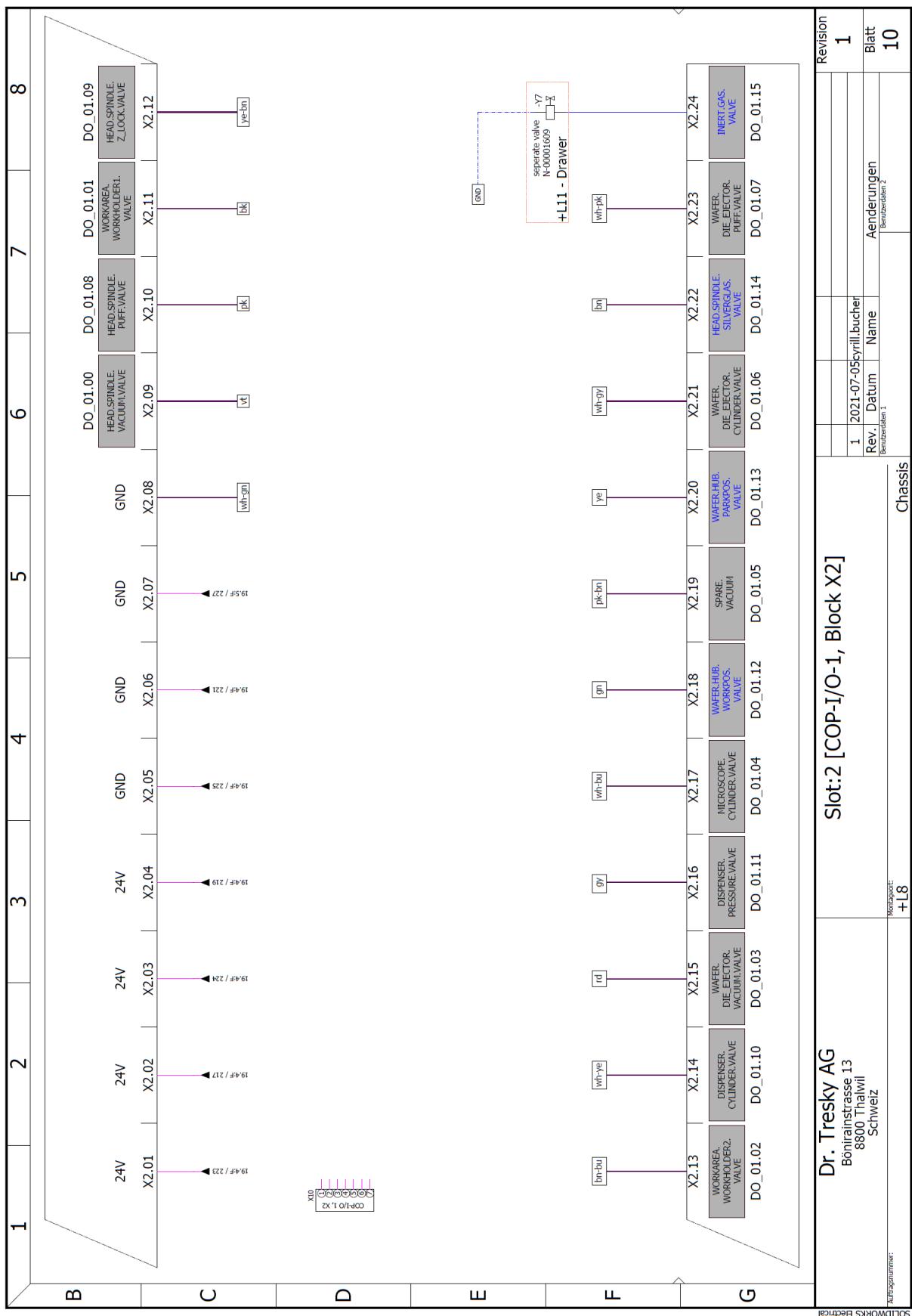


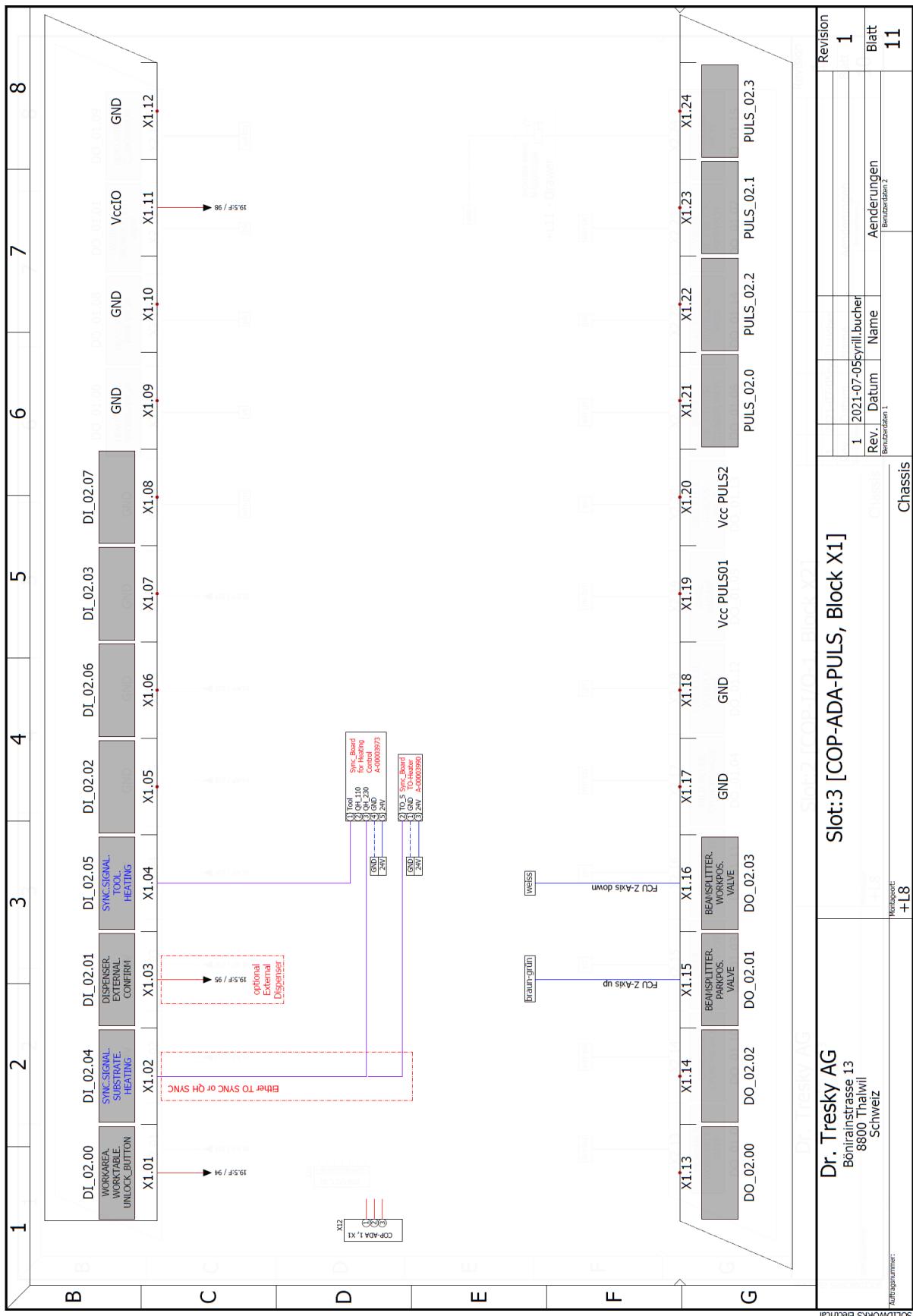
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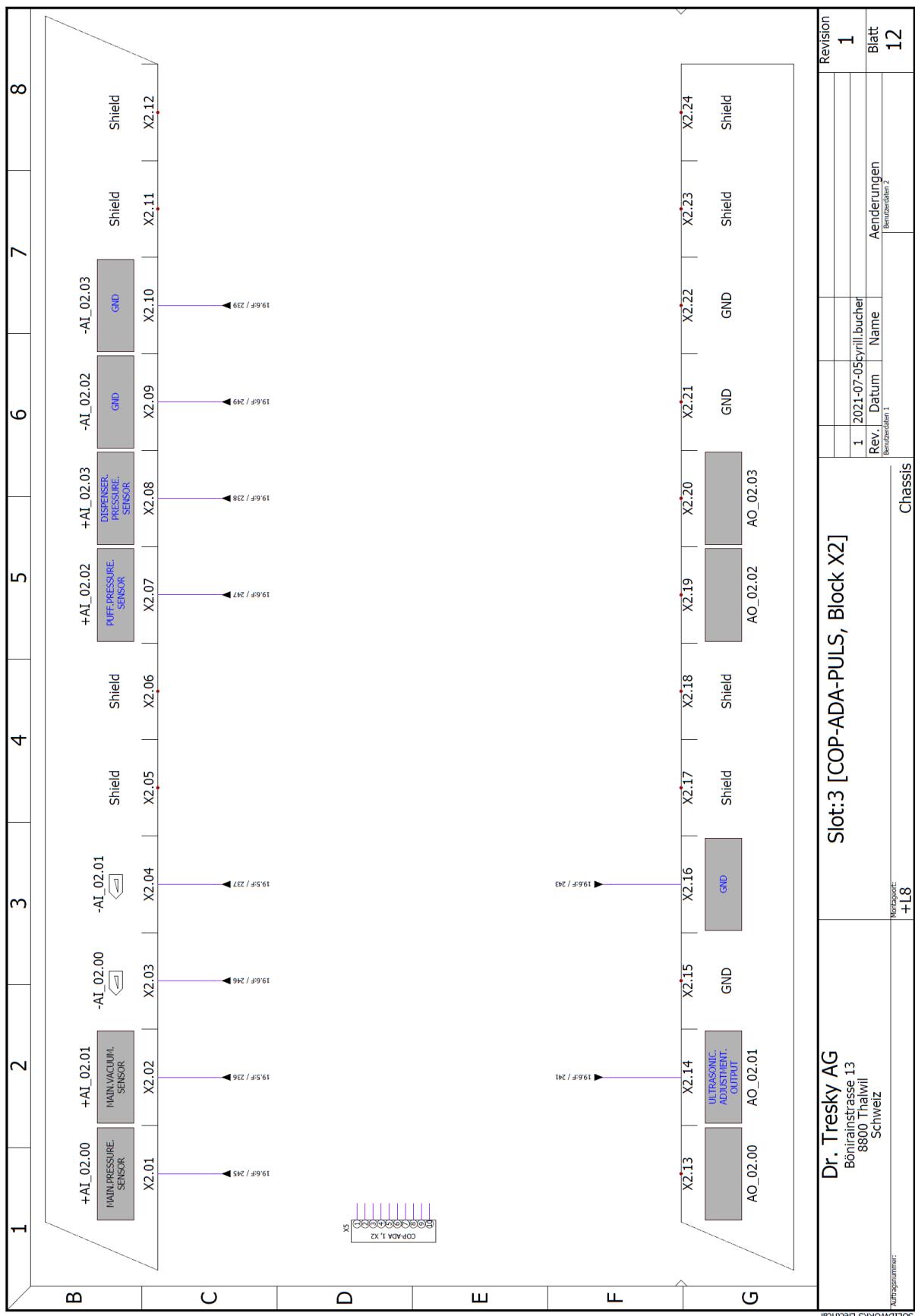
Dr. Tresky AG

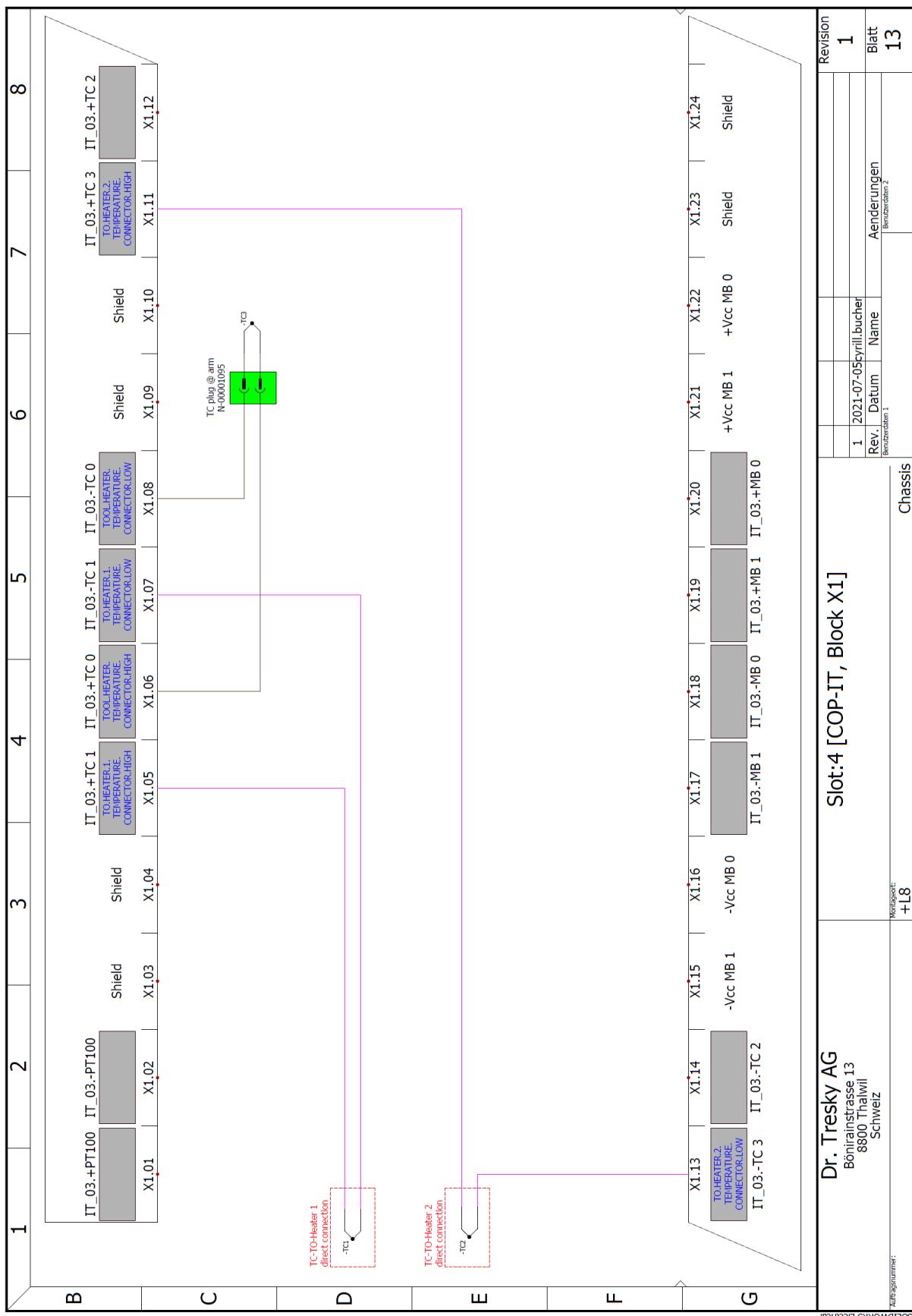


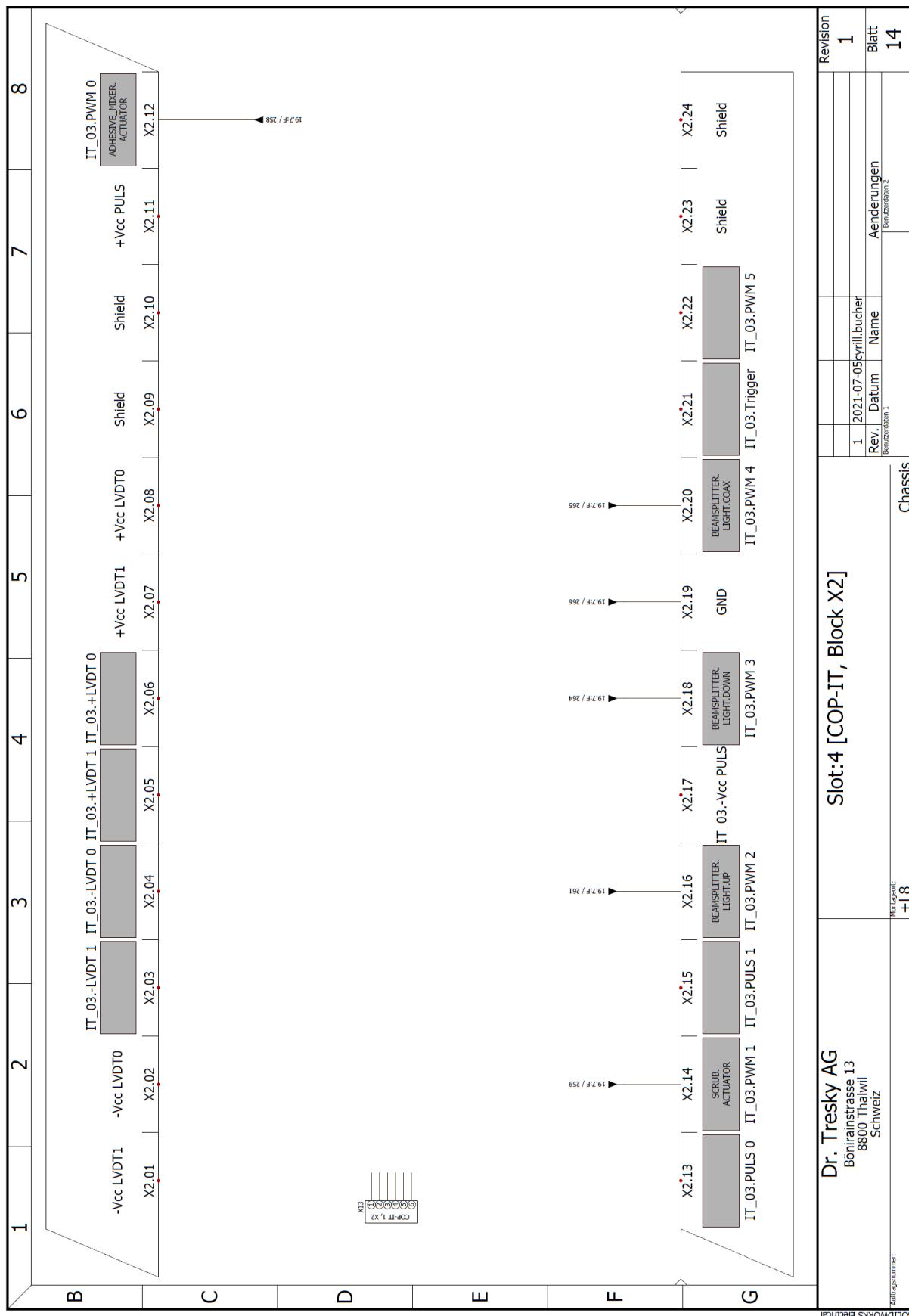


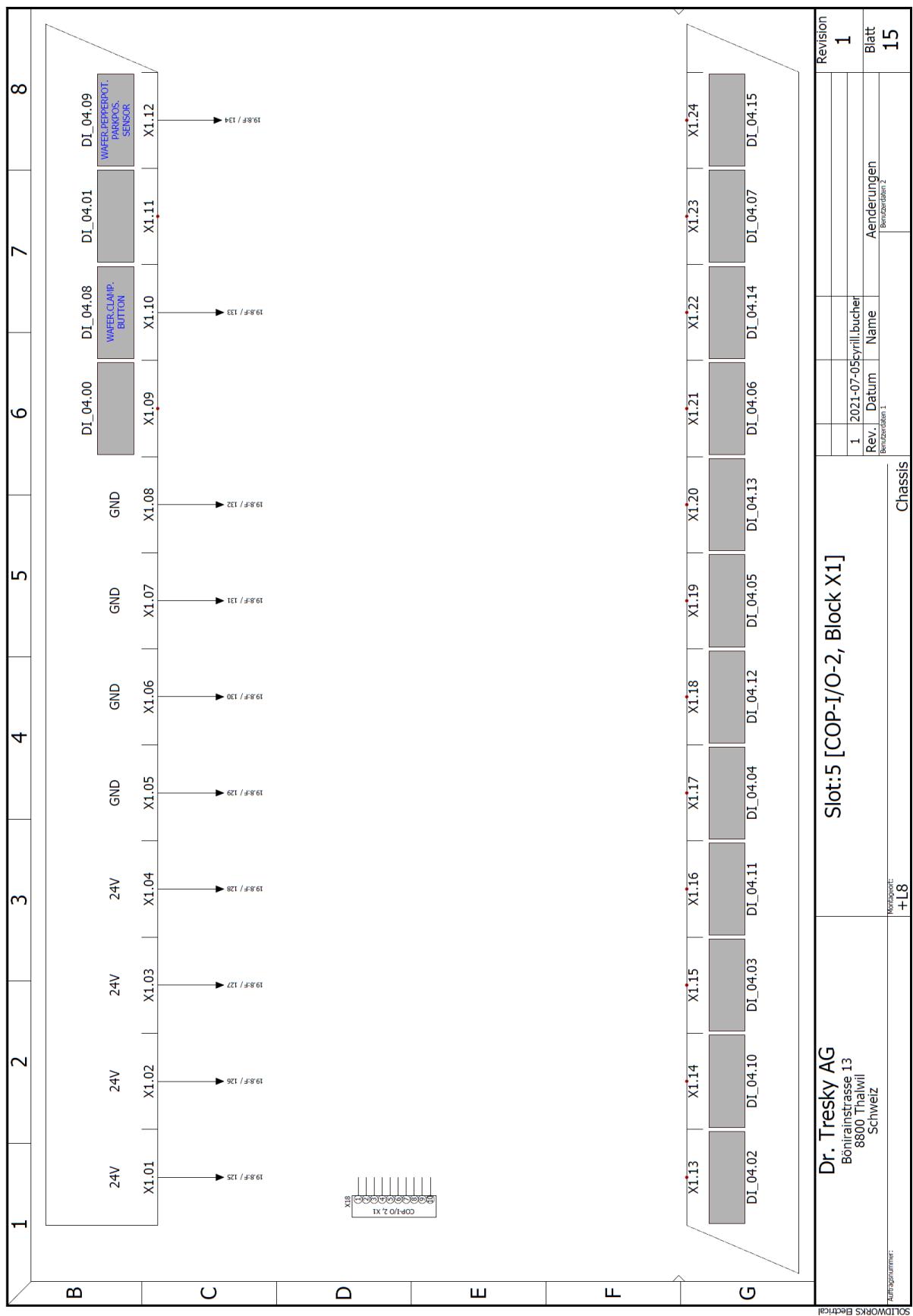


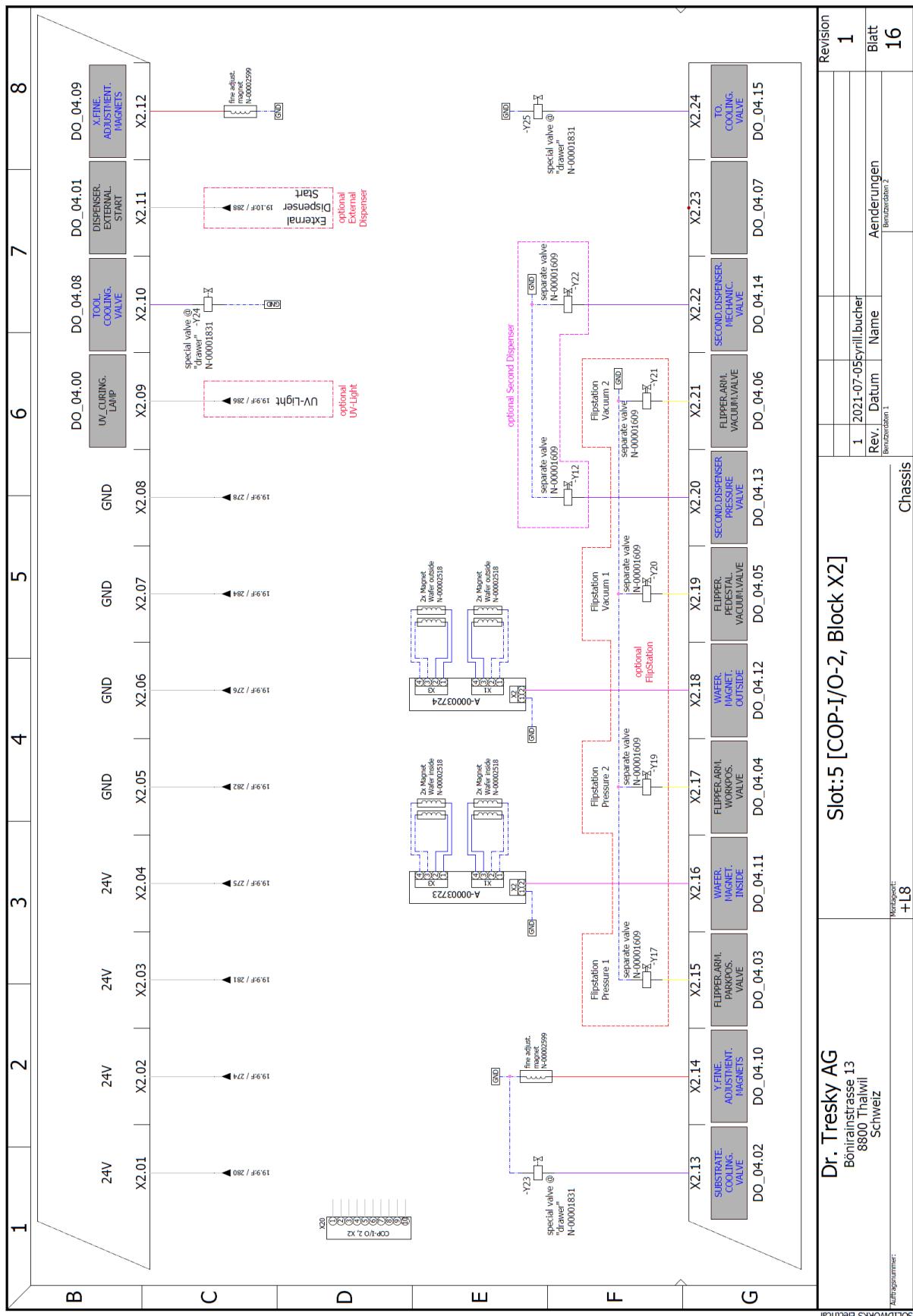


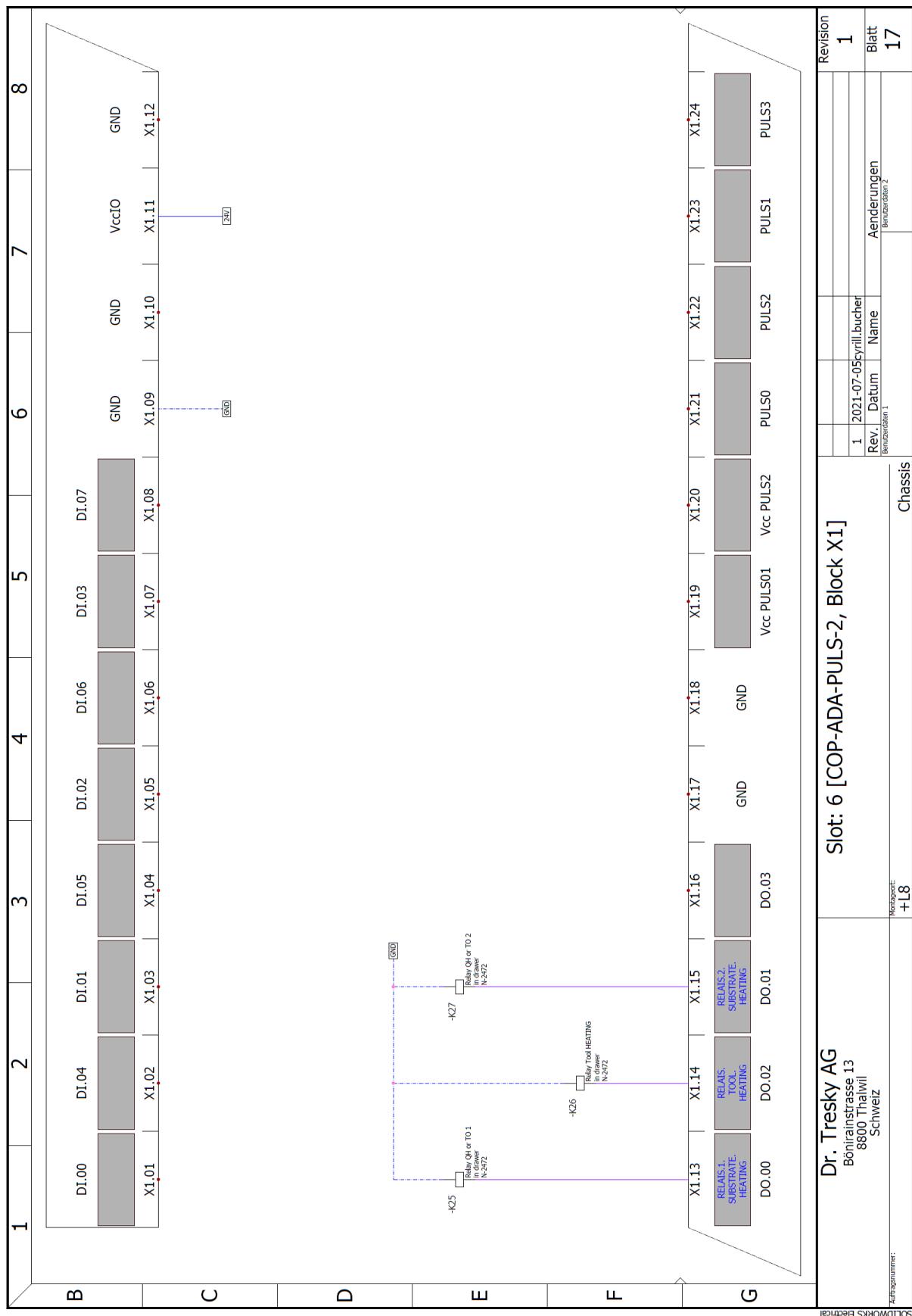


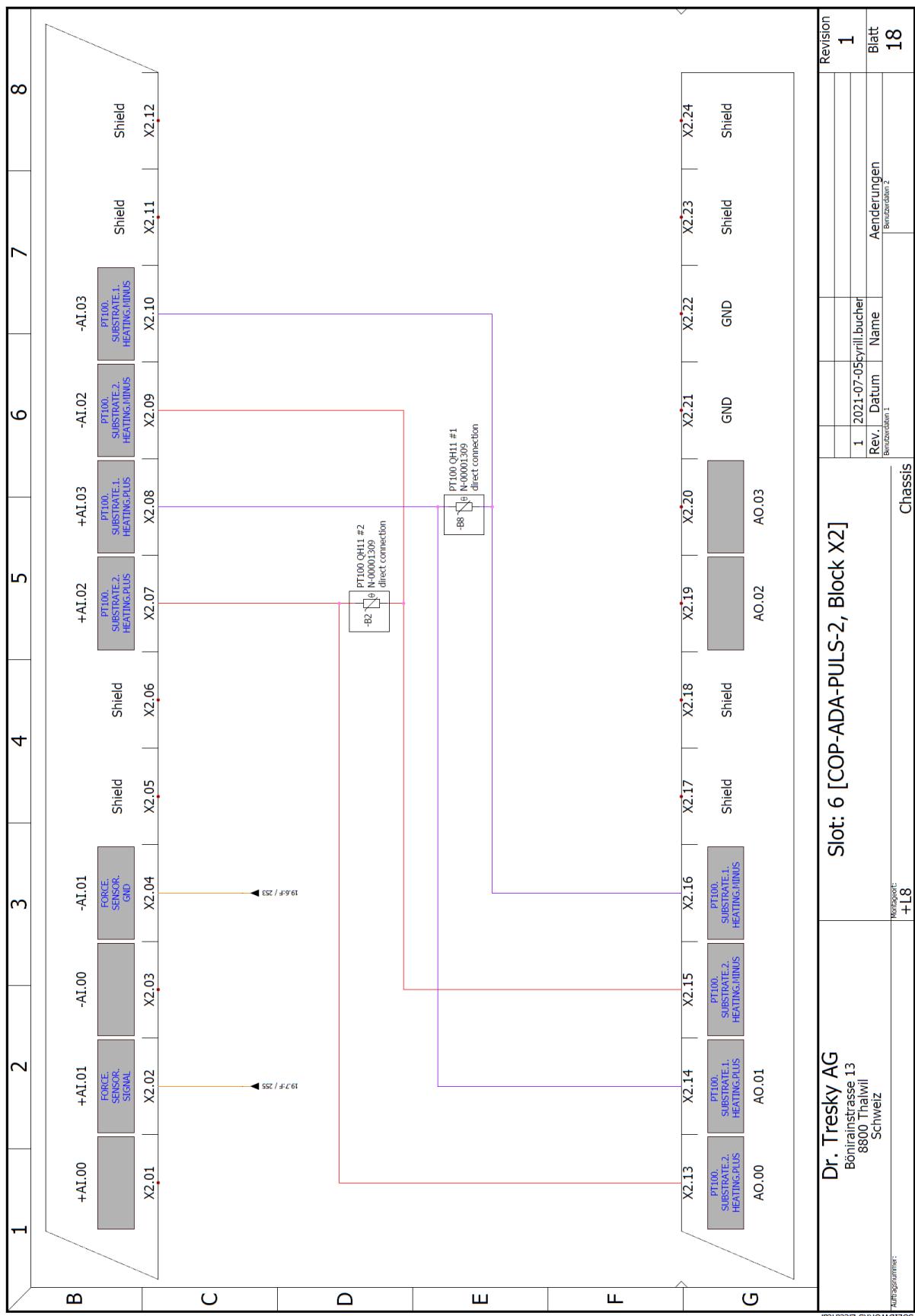


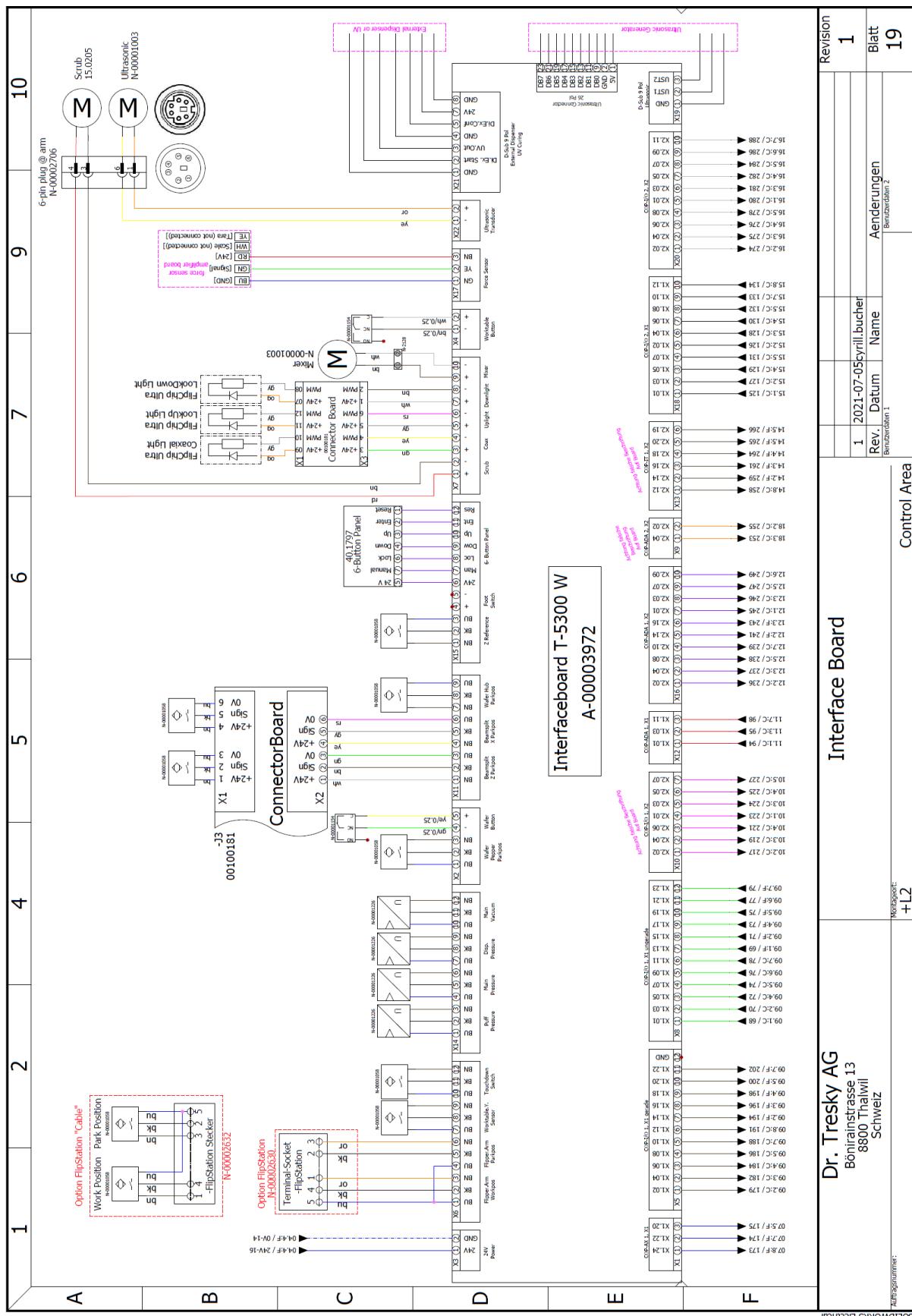


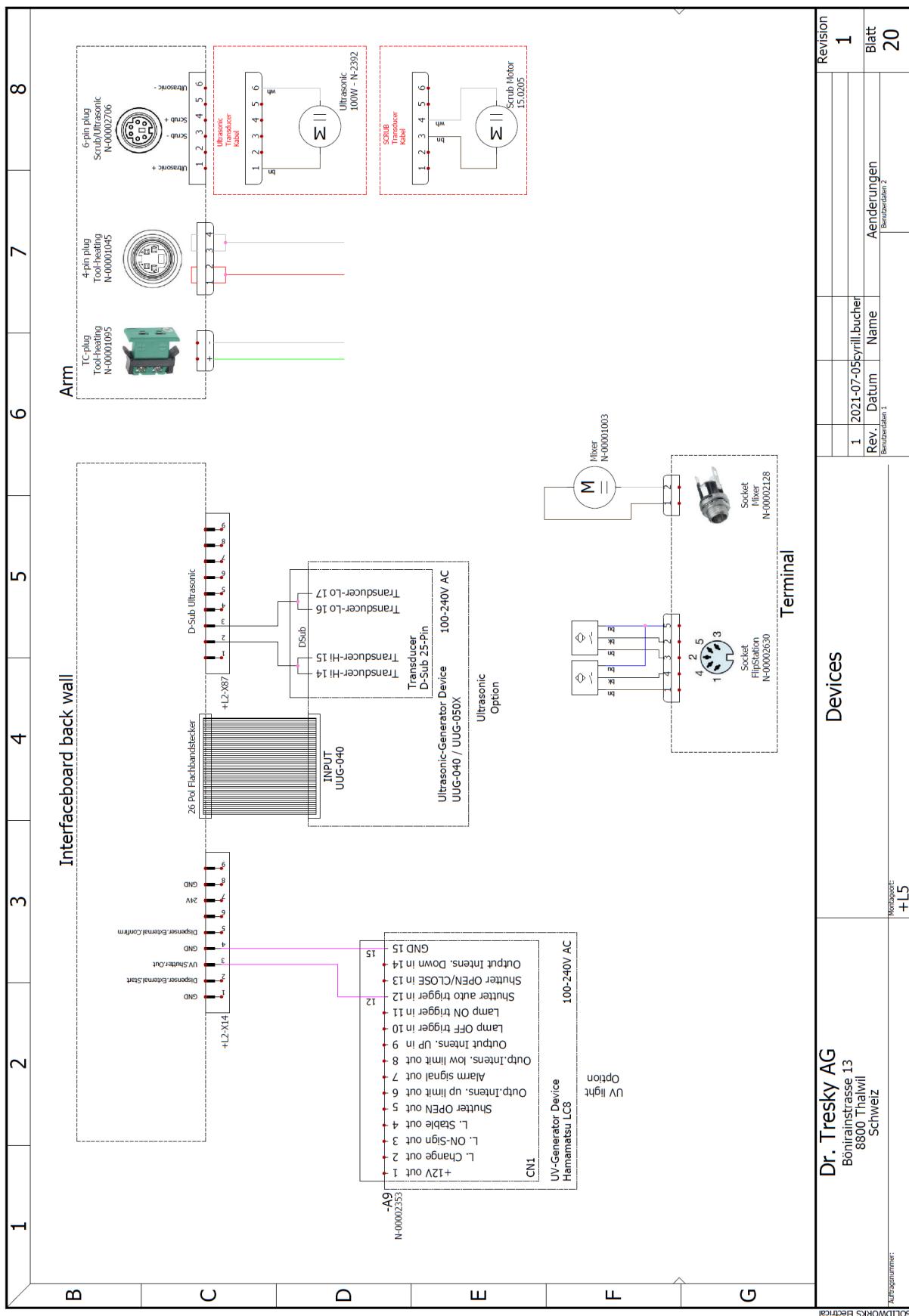


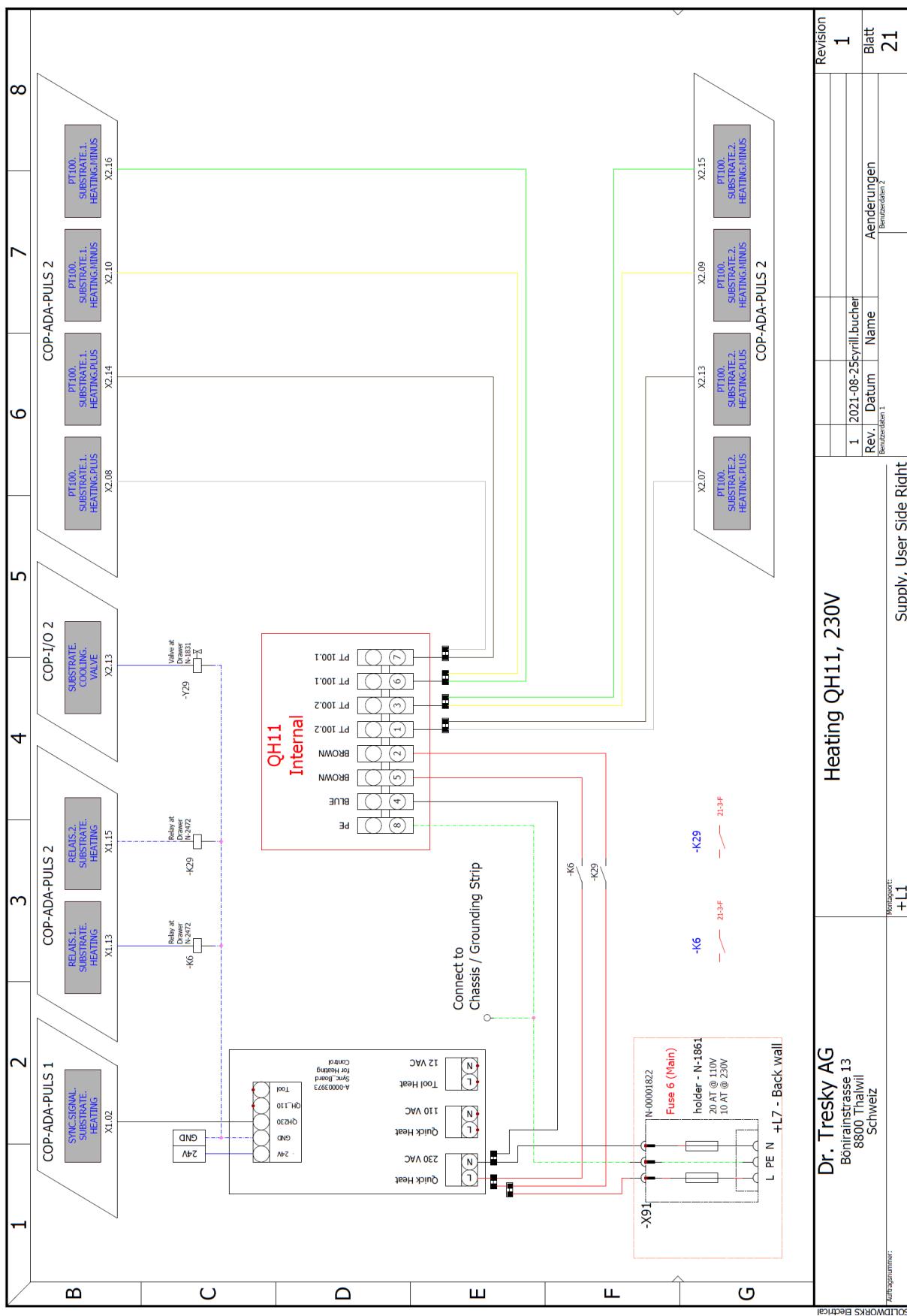


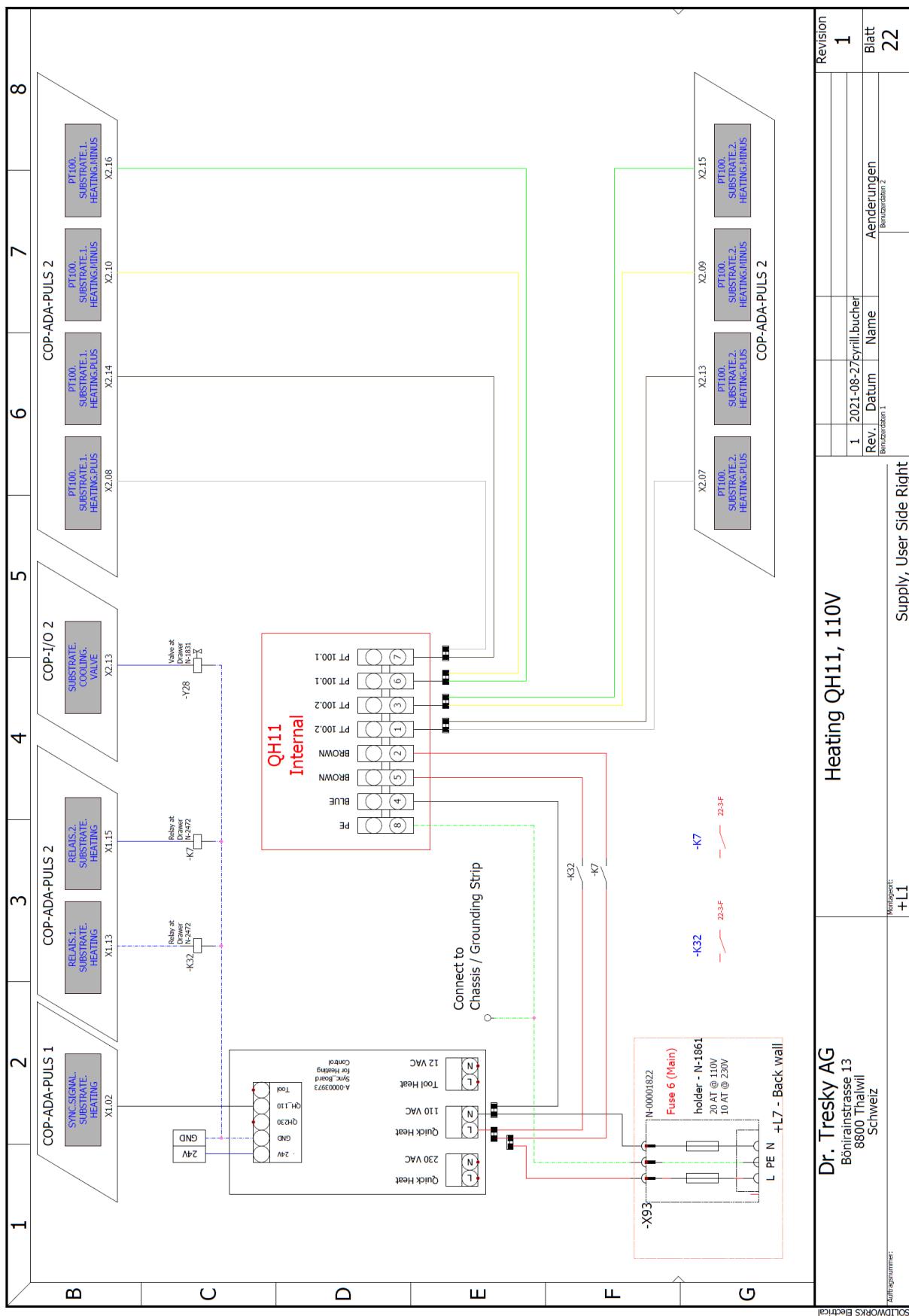


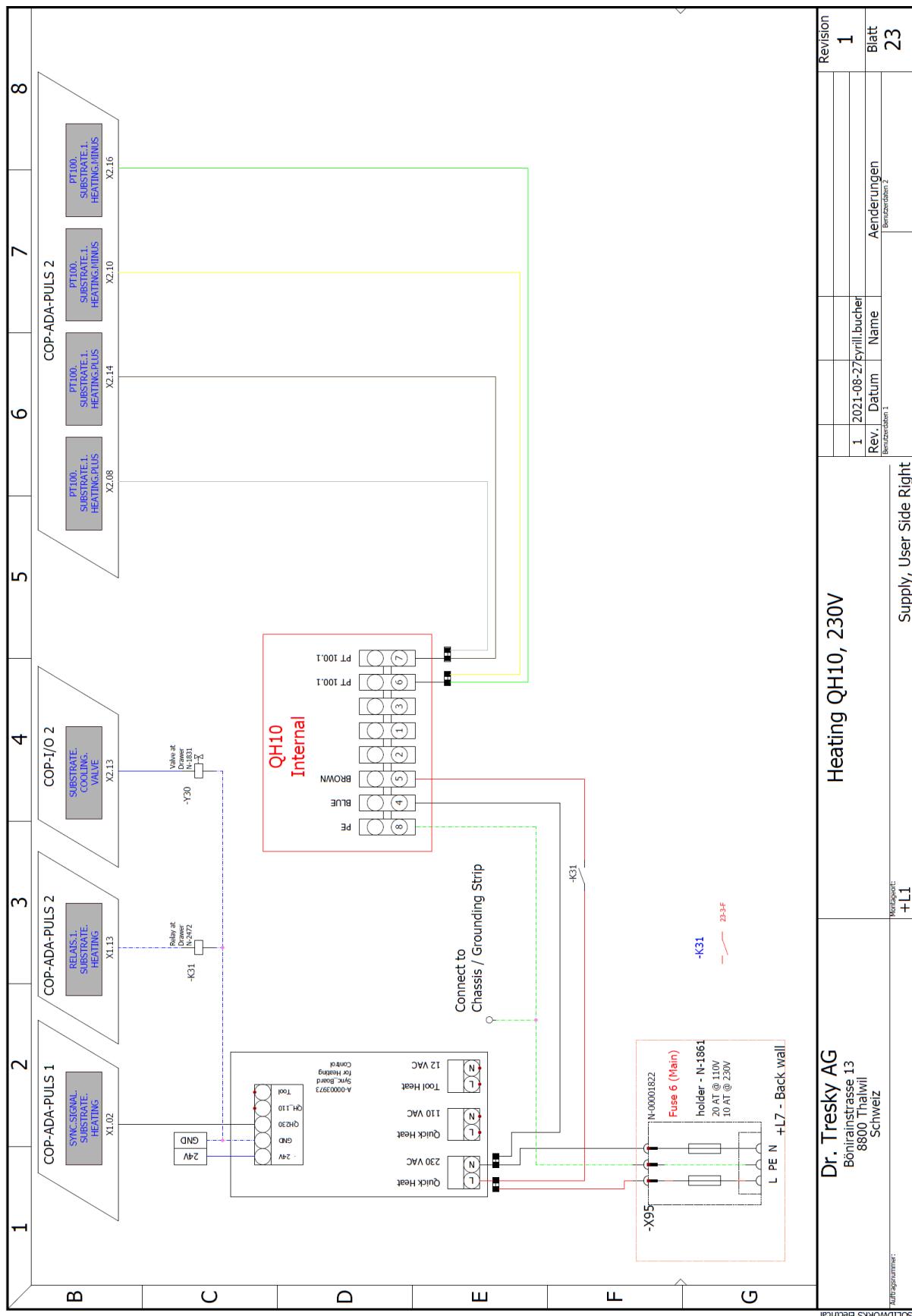


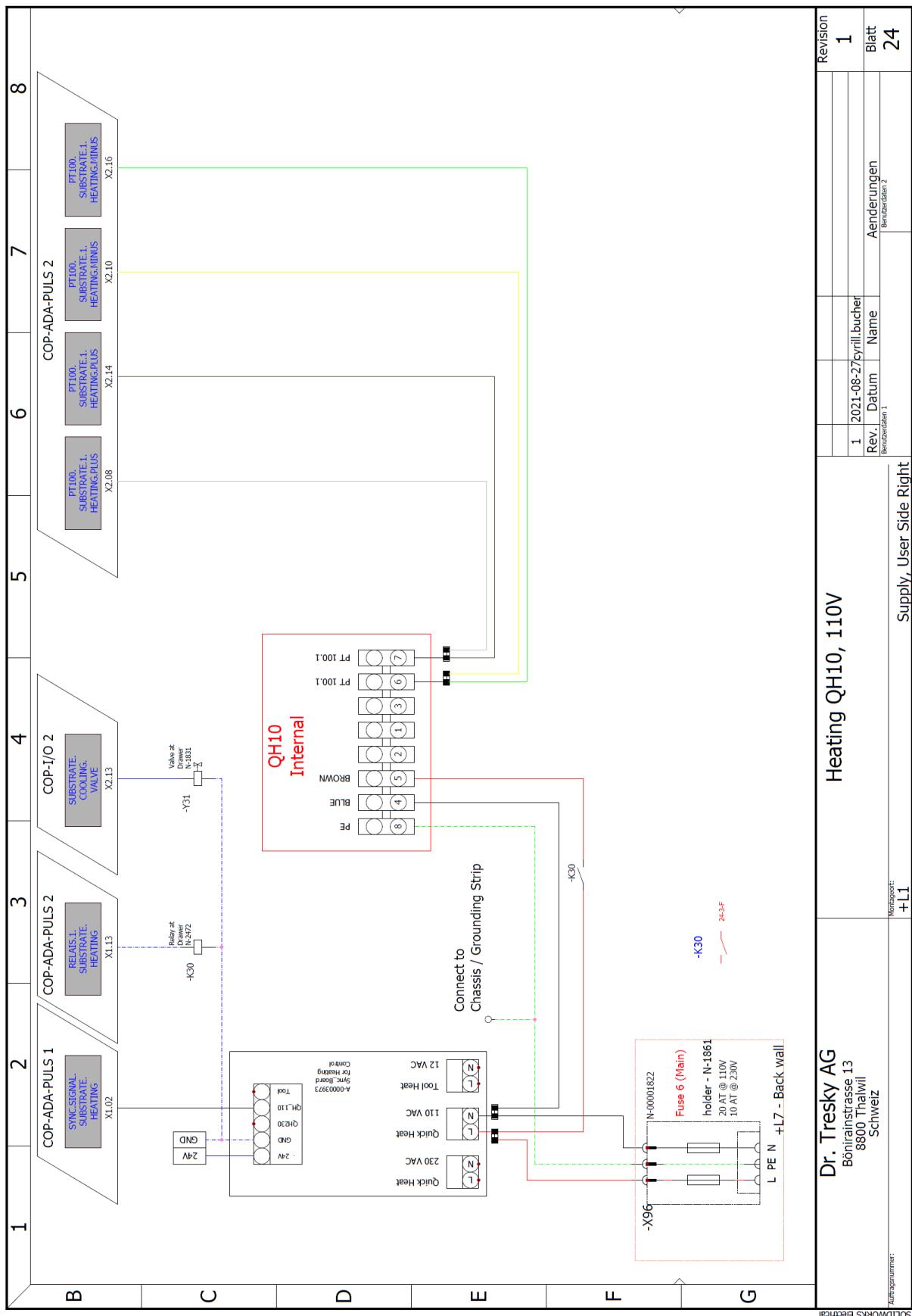


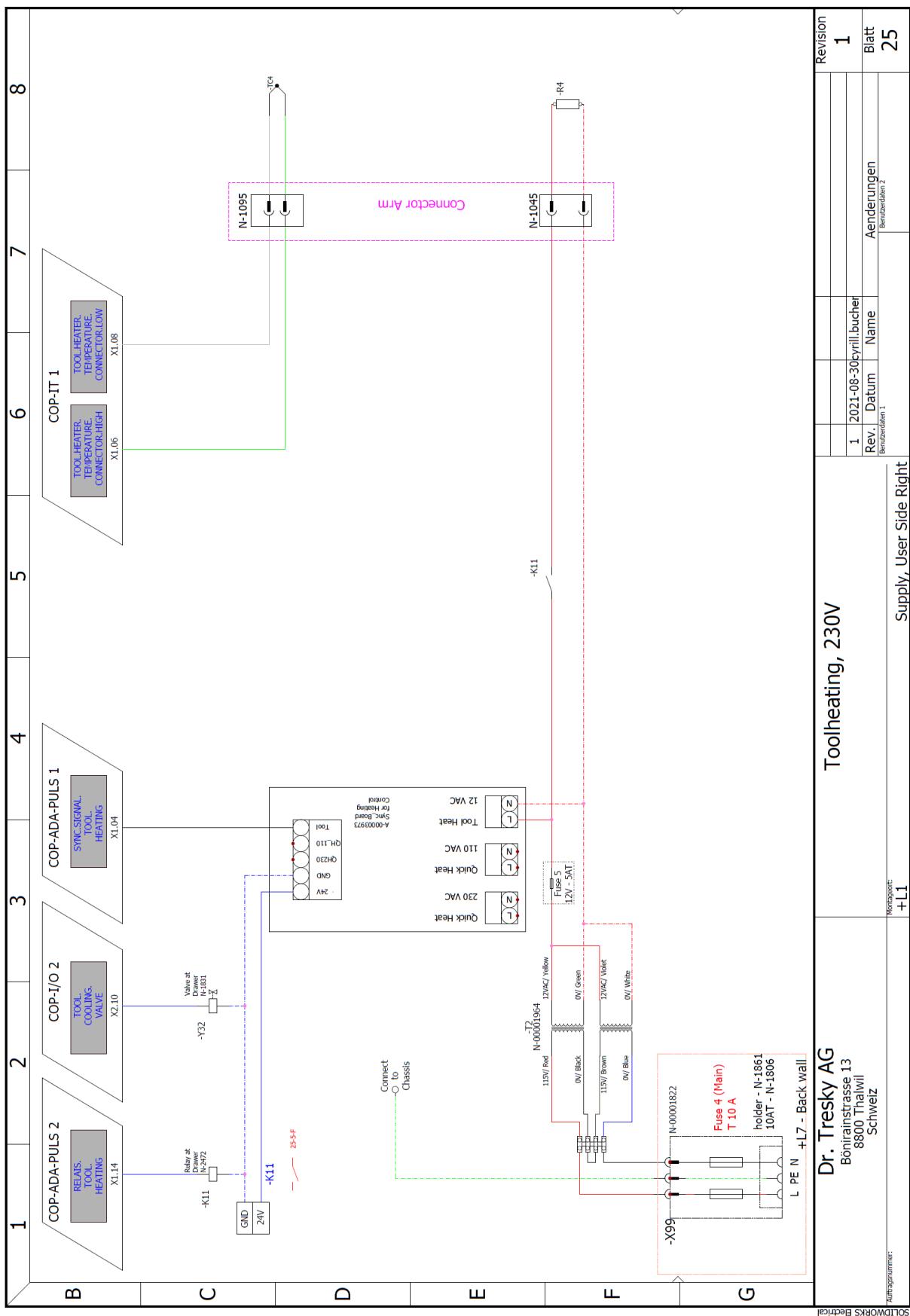


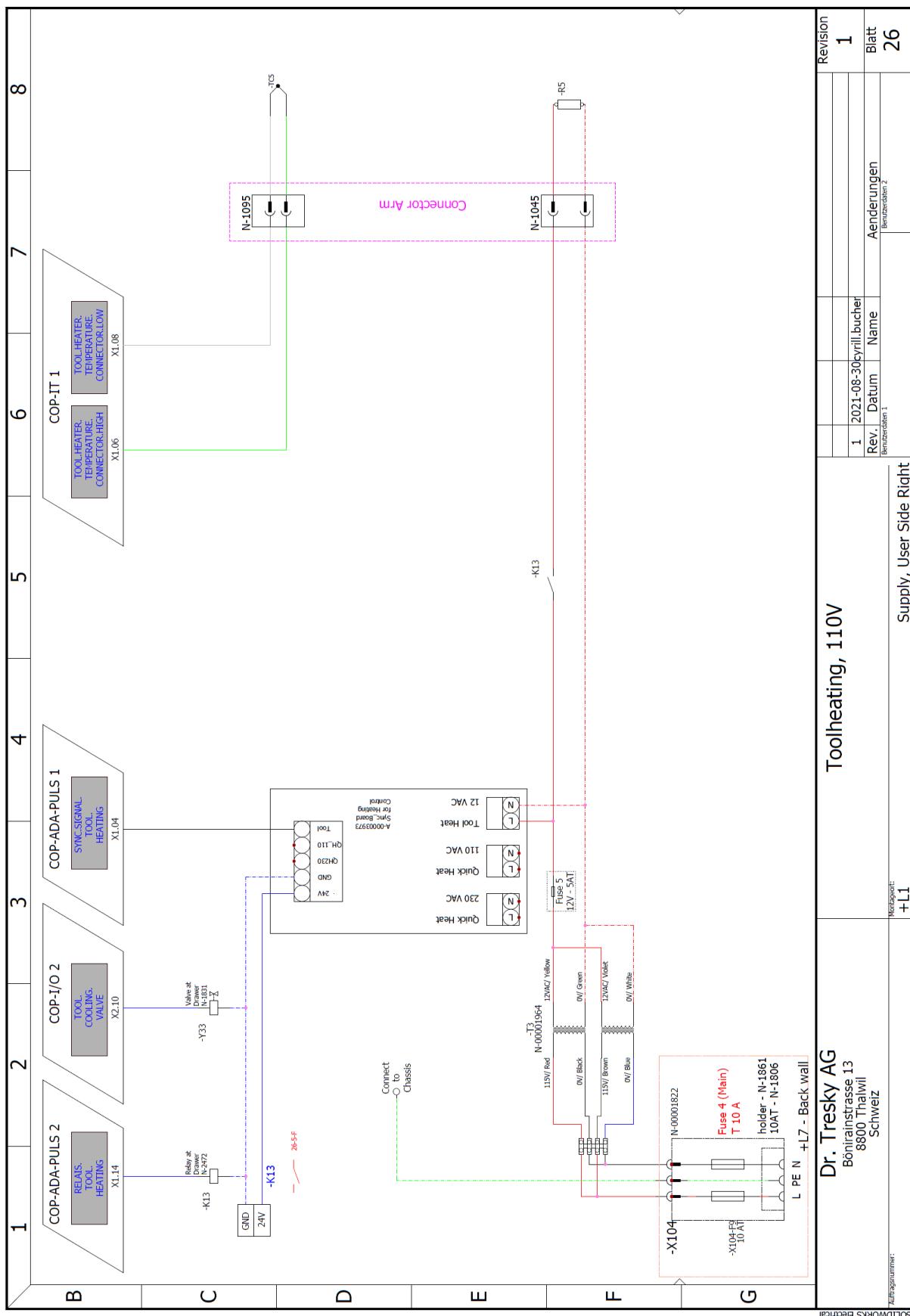


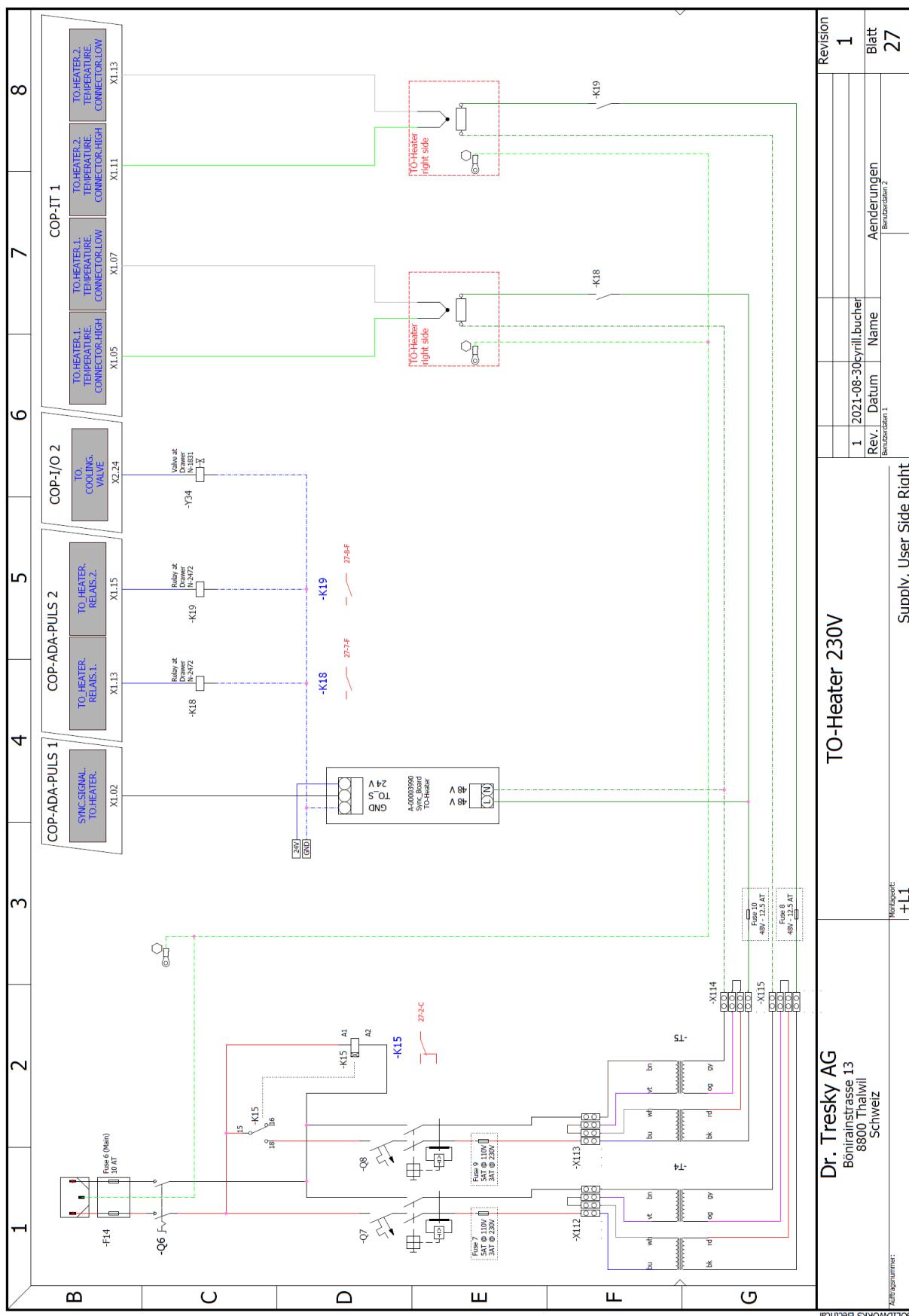


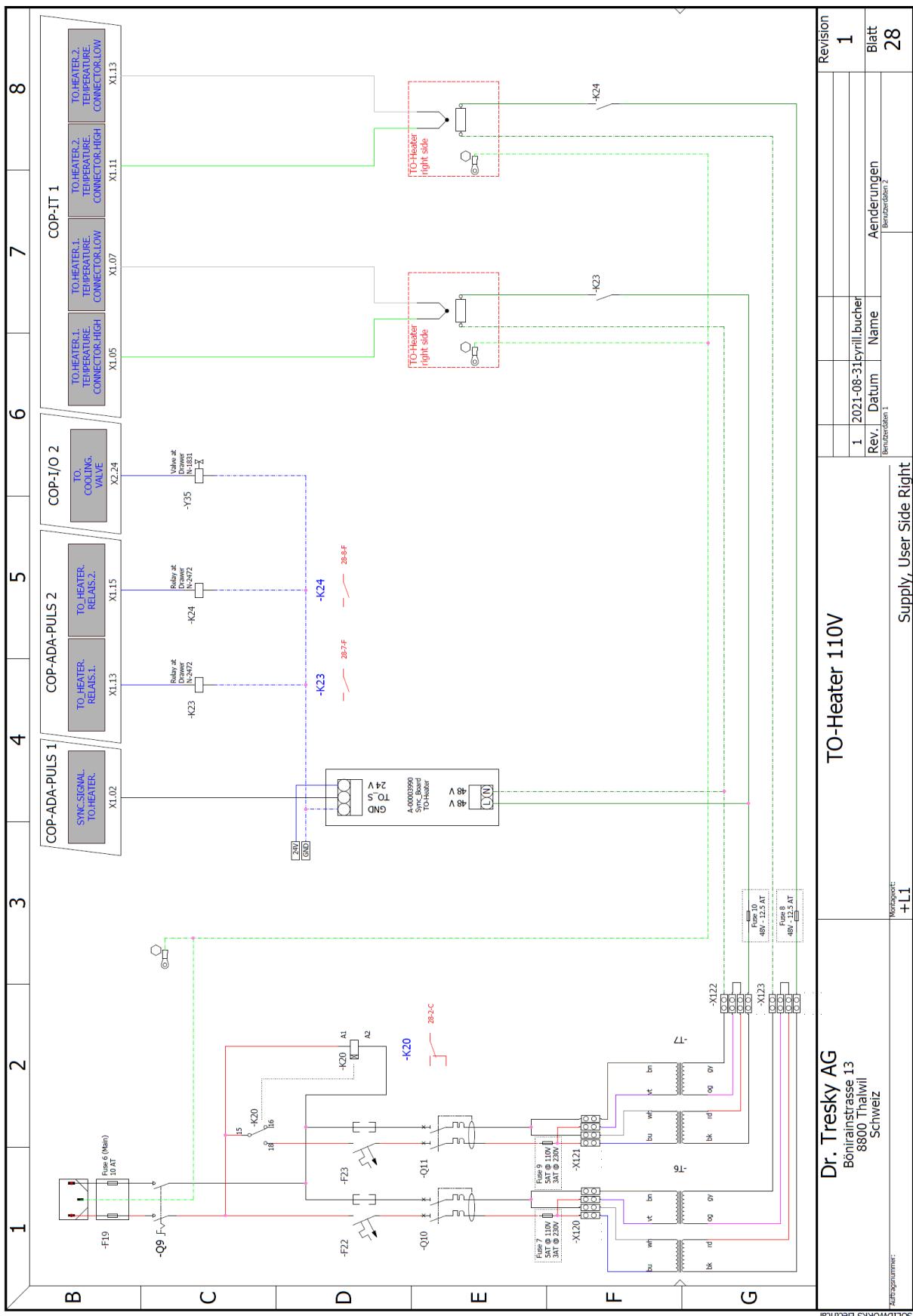


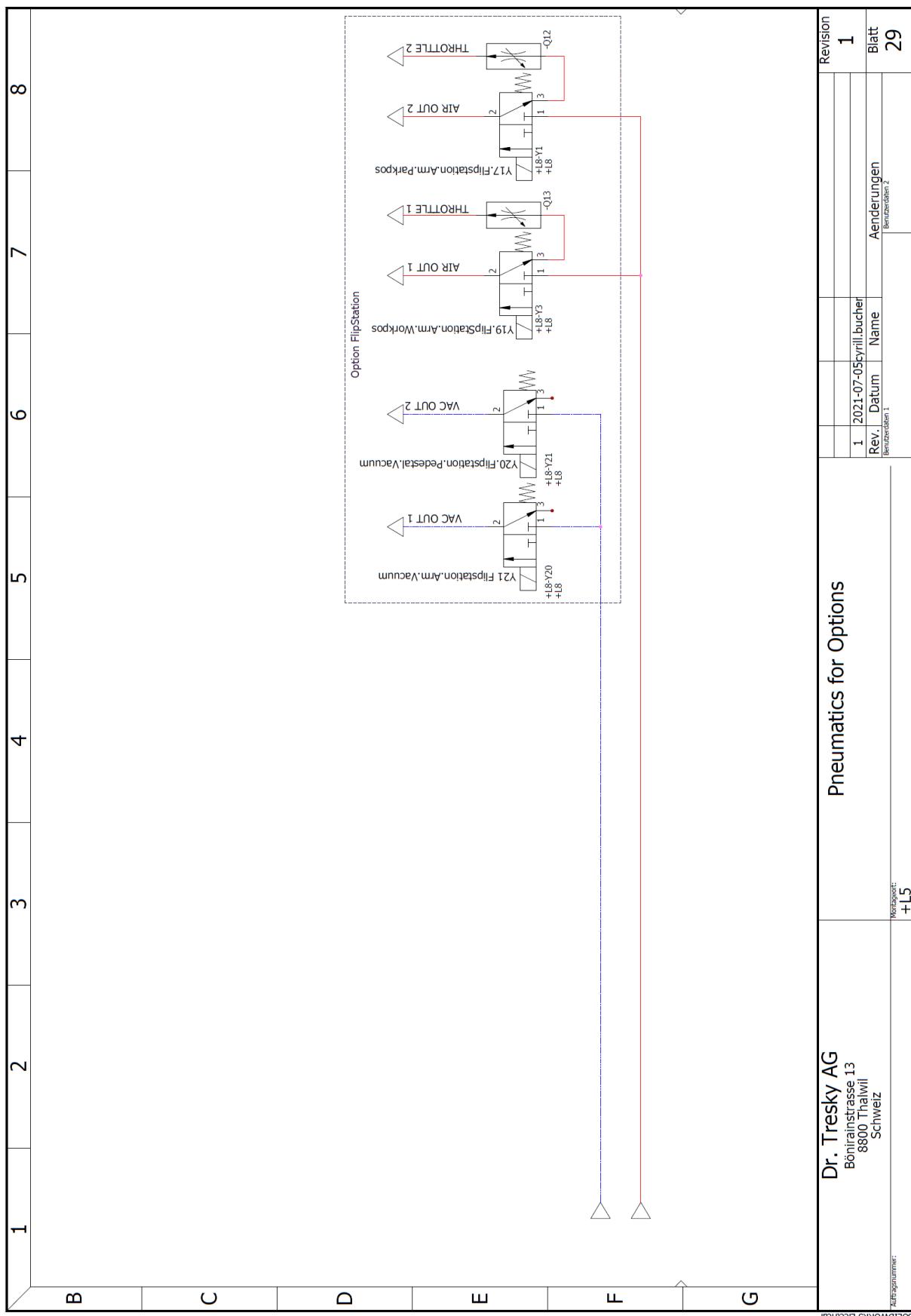


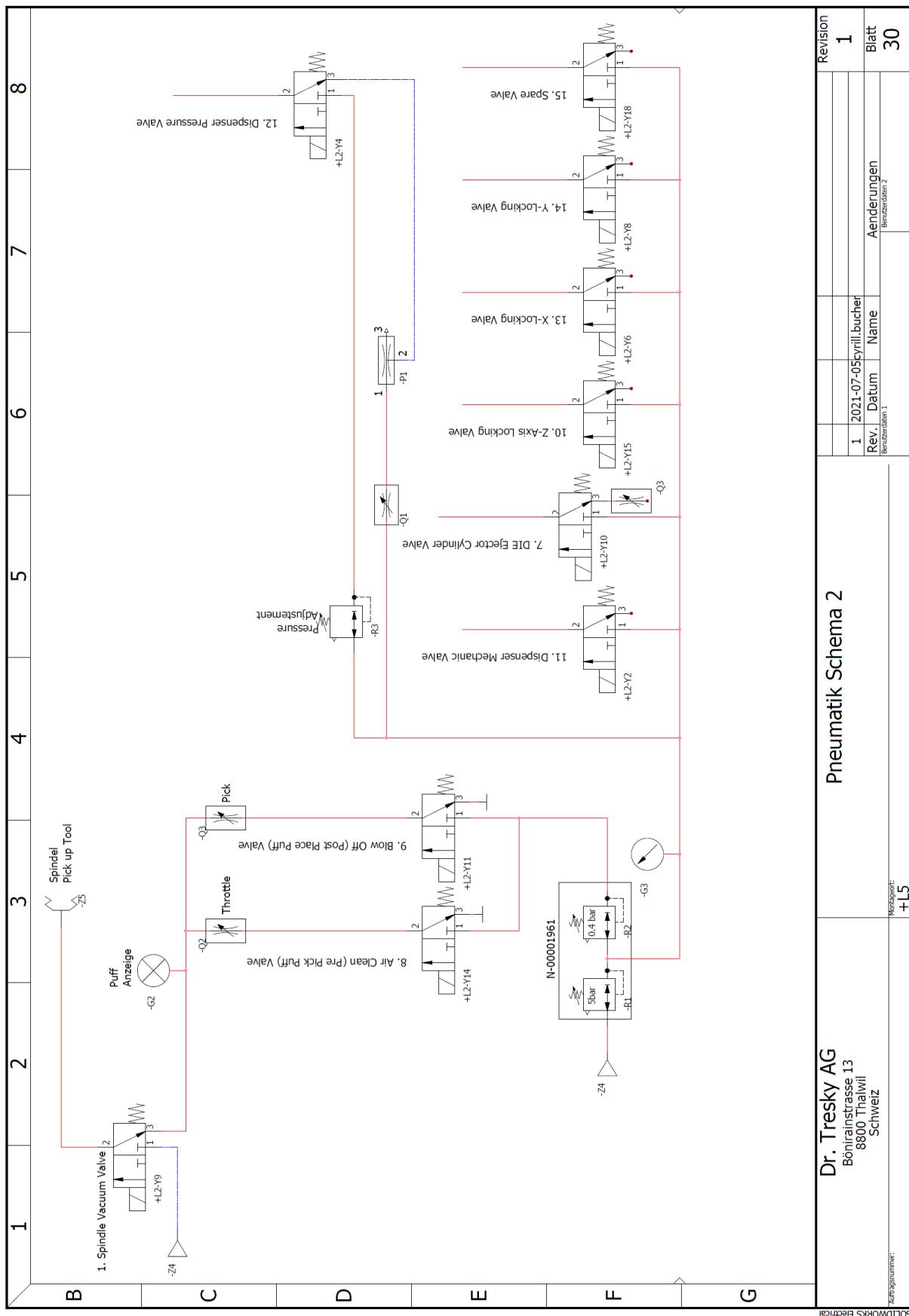


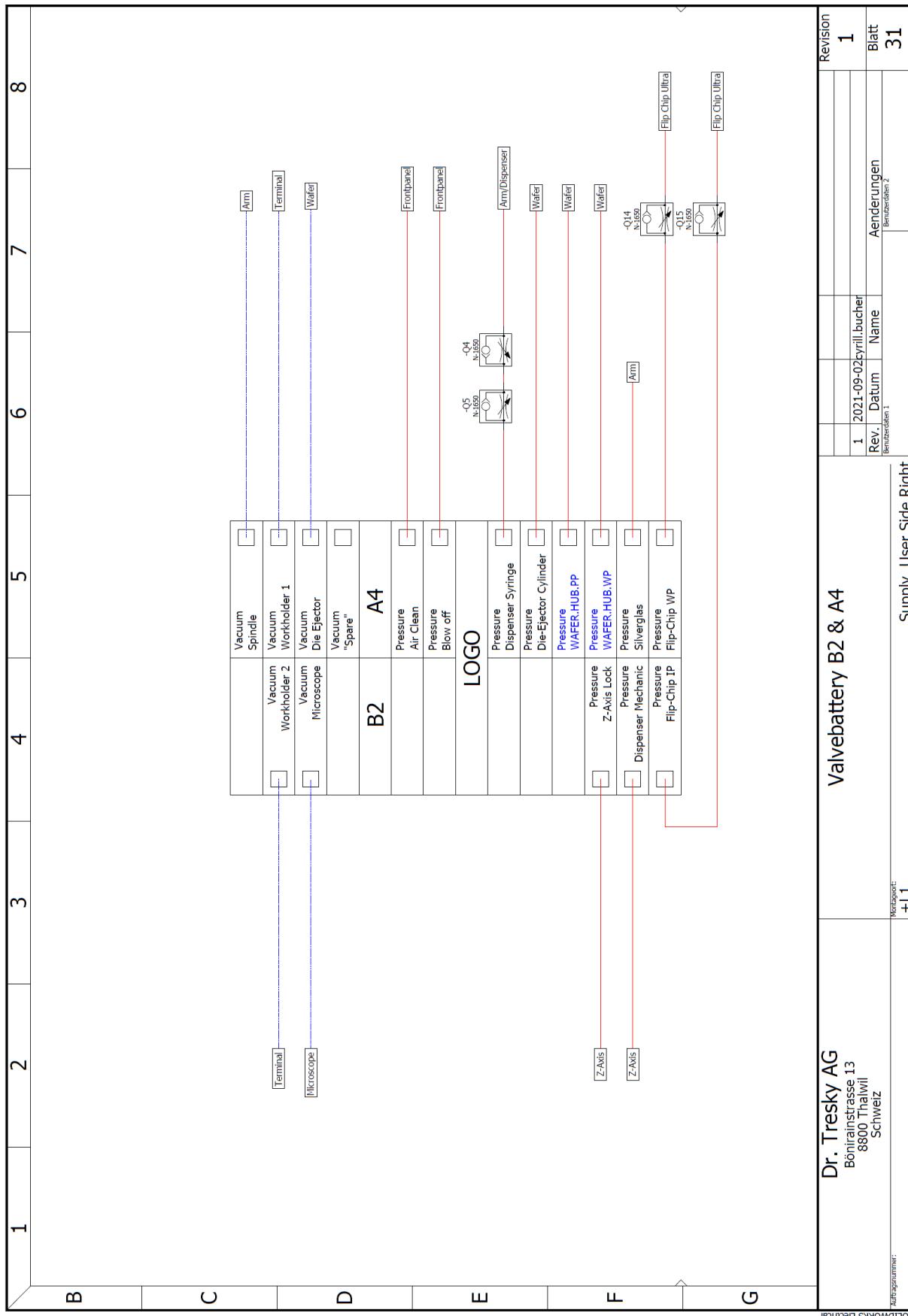


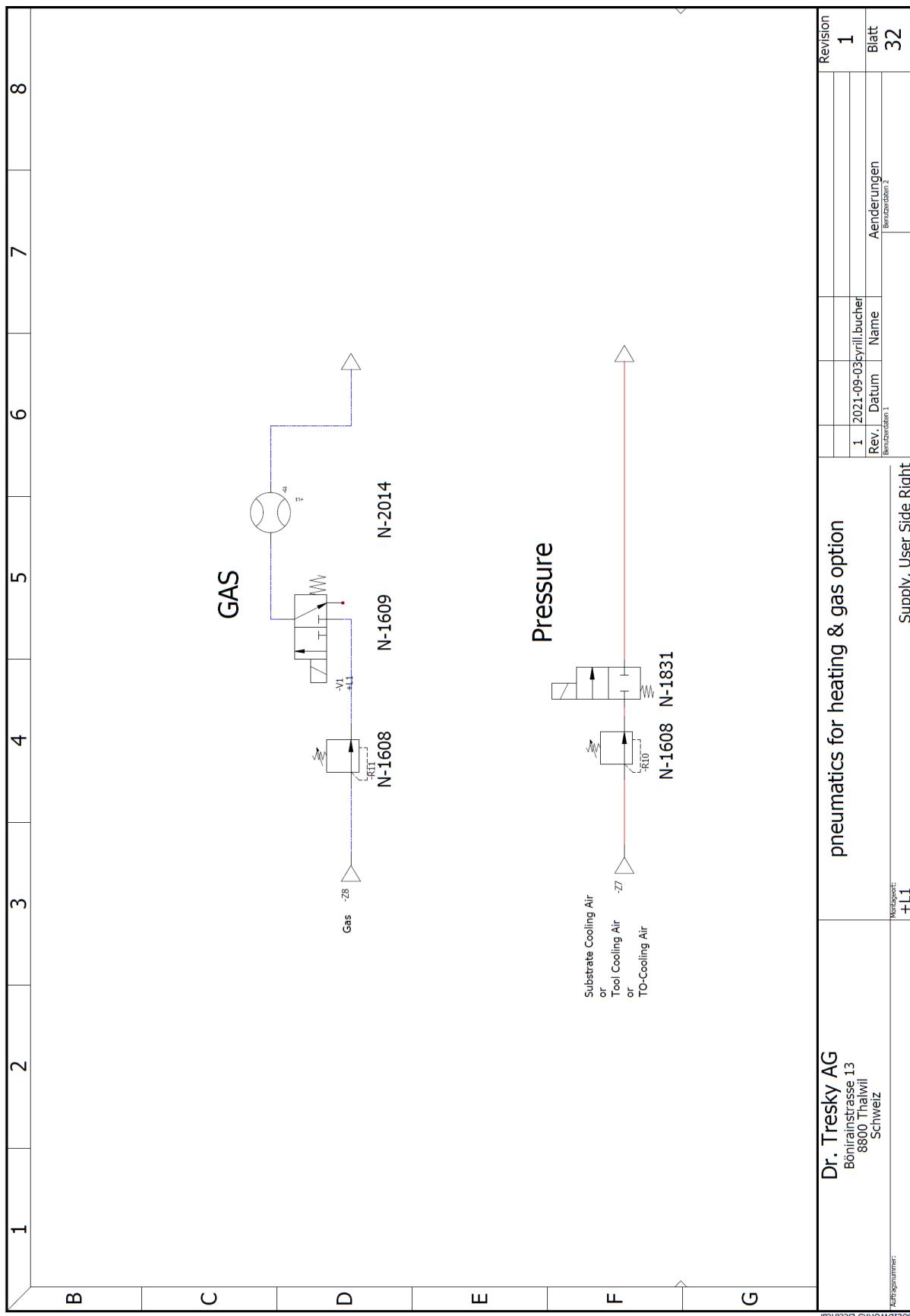


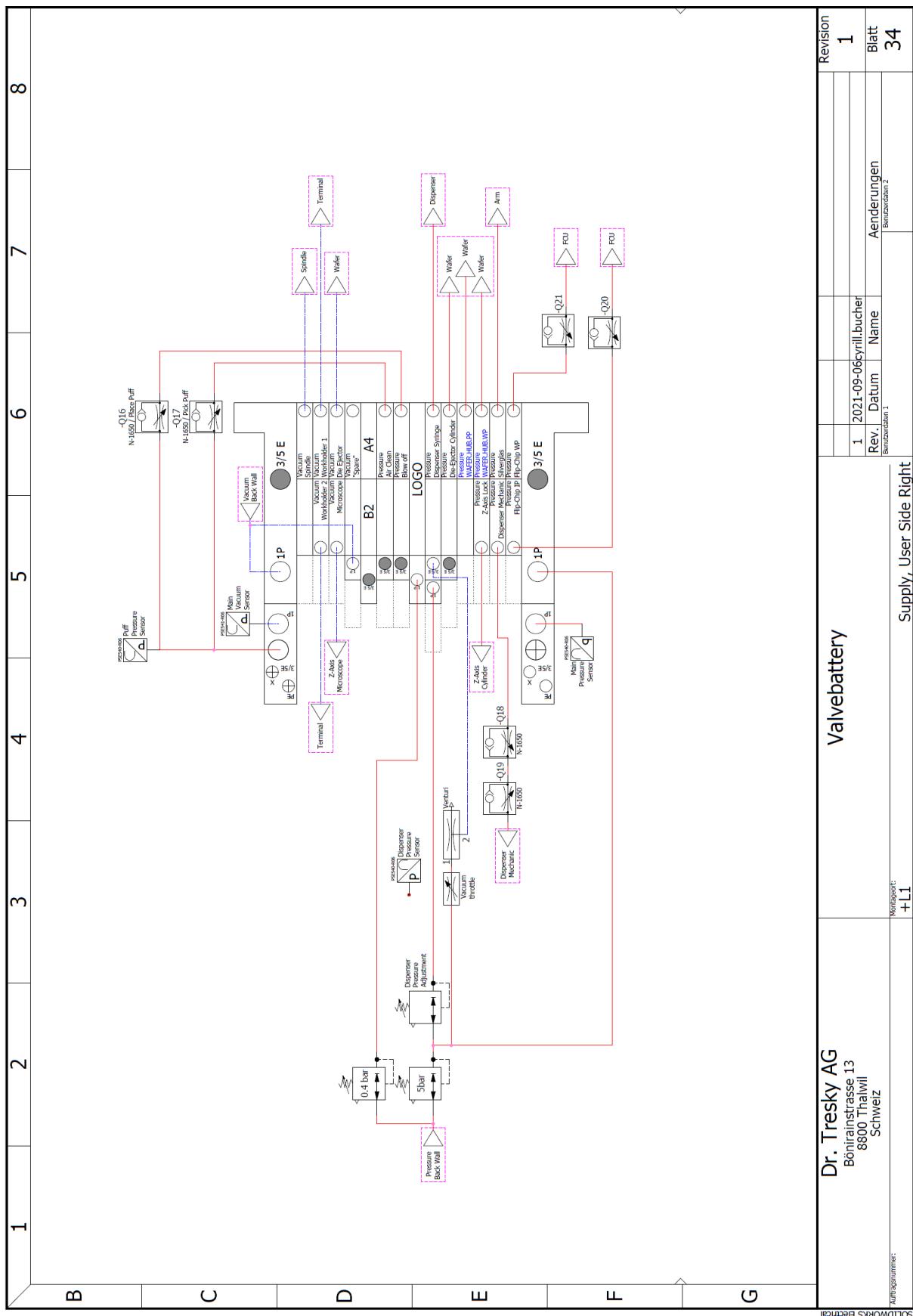




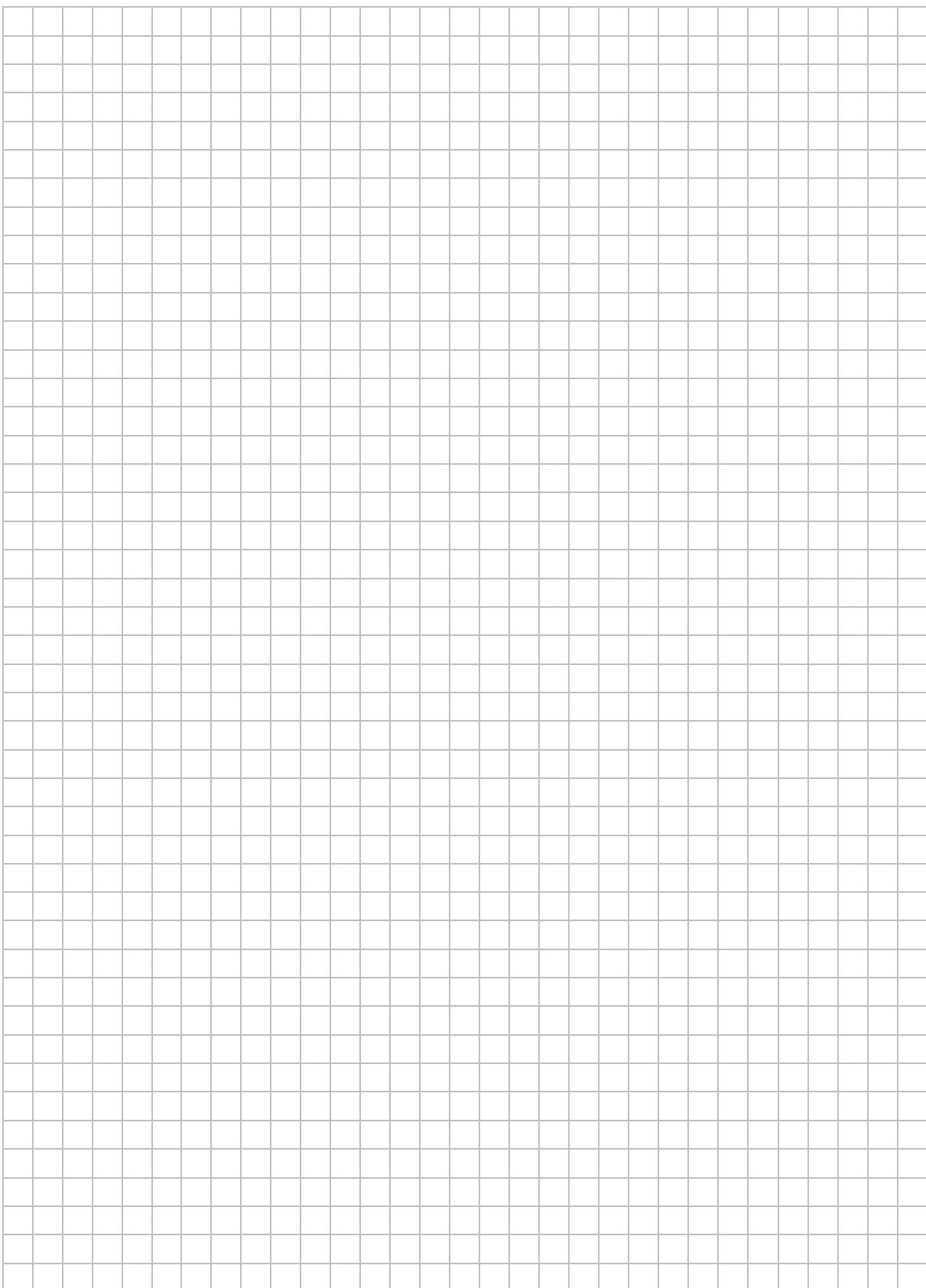




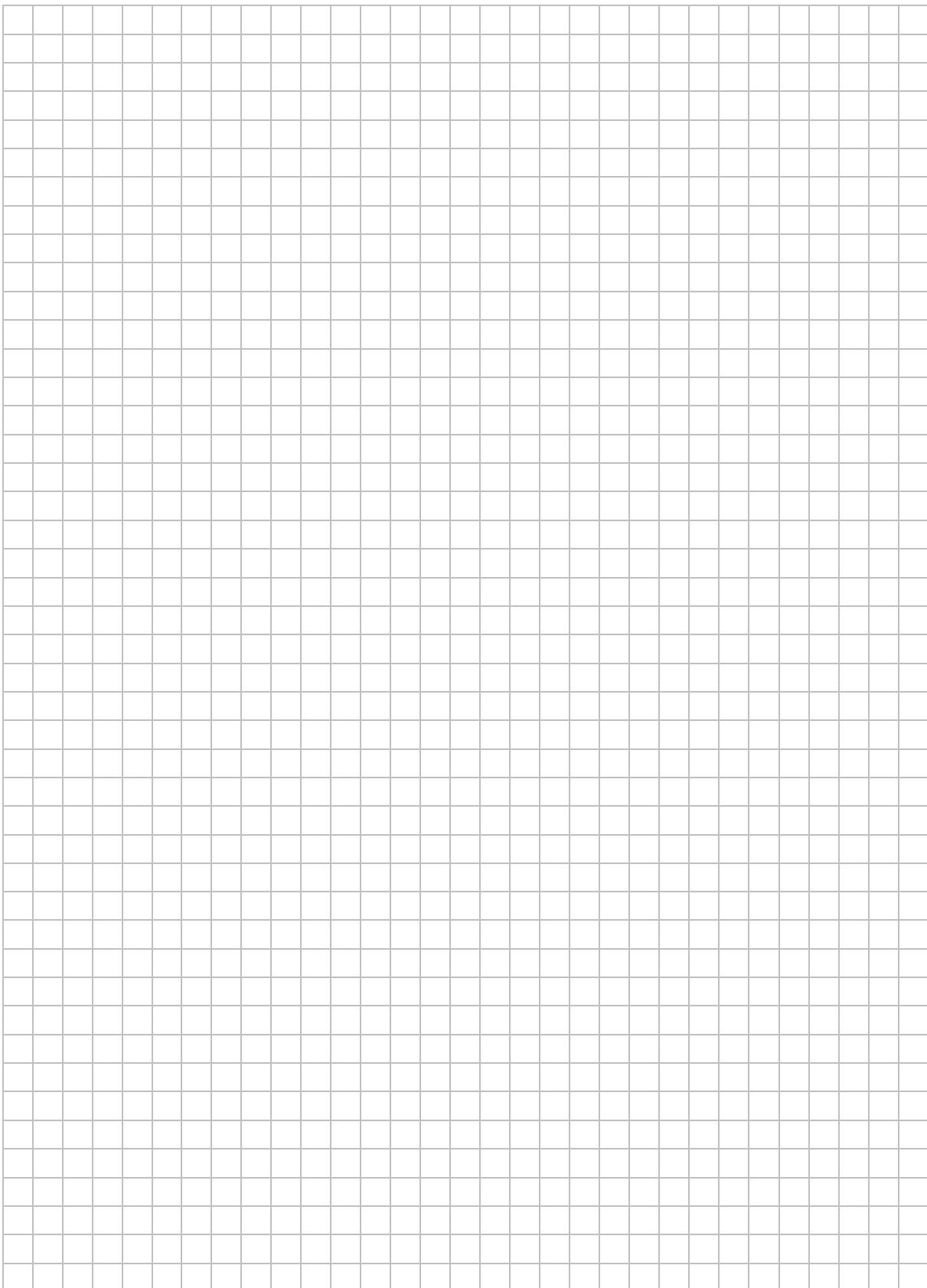




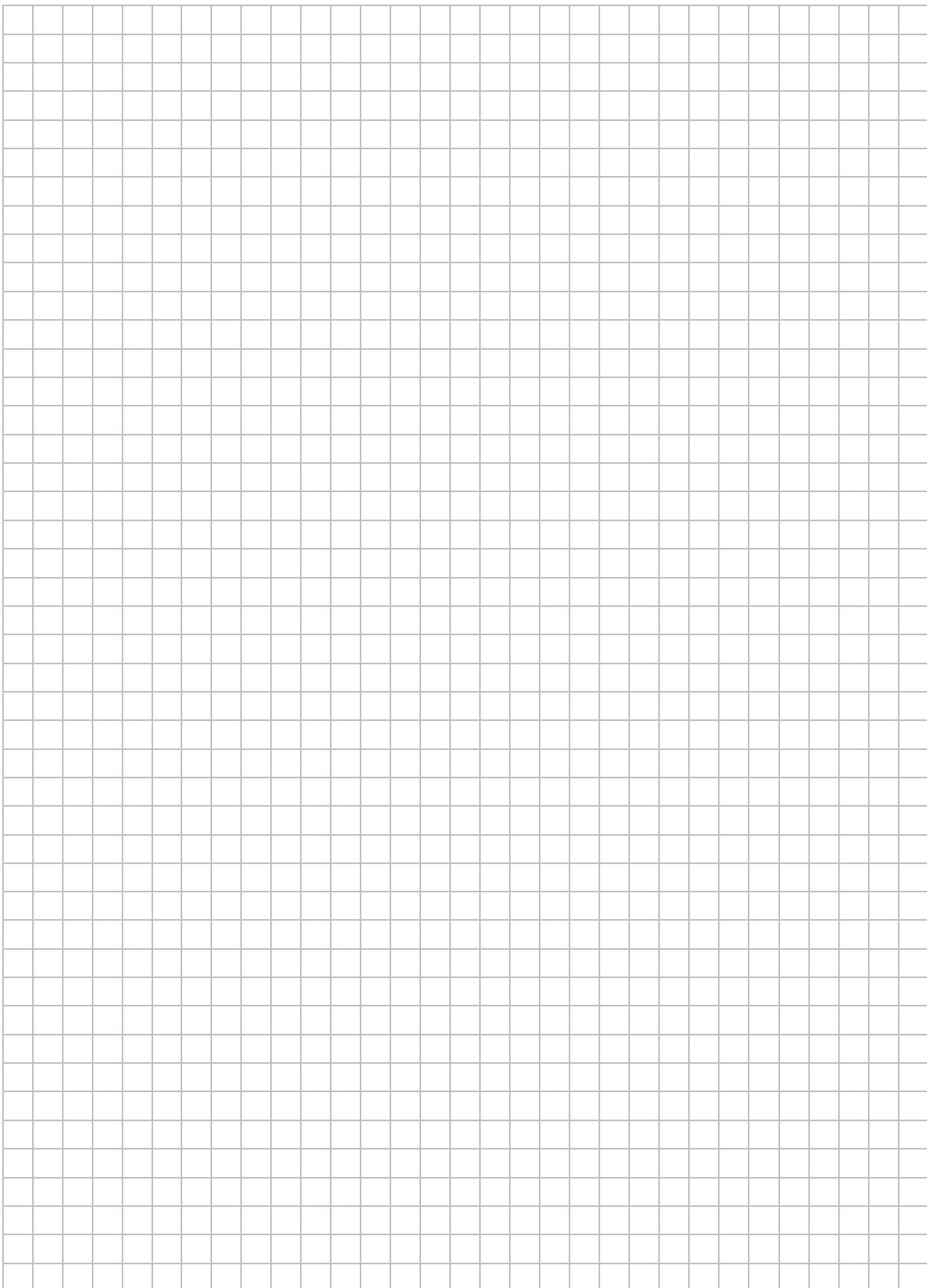
**Notes:**



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